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Obstetrics in the 90's:
New Technology
Healthier Babies

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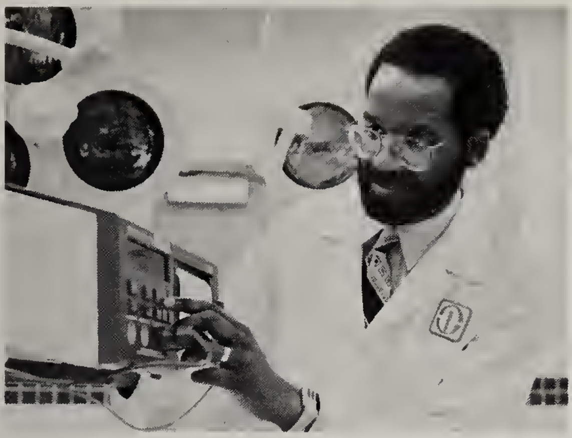

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Facing page: Recent arrivals at the Rush Perinatal Center—the Clancy quadruplets. (See Obstetrics in the 90s, page 3.)

Obstetrics in the 90s: New Technology, Healthier Babies

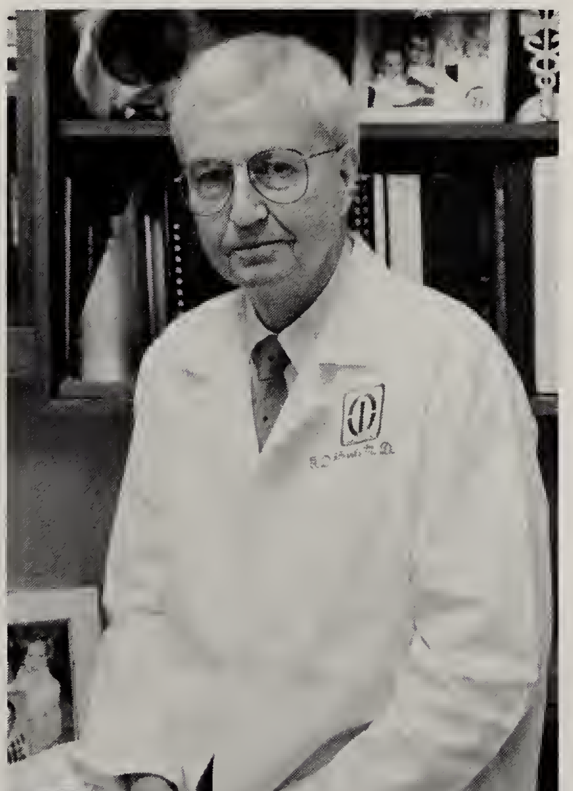
By Krys Kazieczko-Kuszak

People aren't having babies the way they used to.

And, then again, they are.

On the one hand, technology has changed the face of obstetrics in the last 25 years. On the other, mothers are returning to the idea of having their babies, if not at home, at least in a homelike atmosphere.

First, technology. With ultrasound we can "see" the fetus in the womb to assess health and detect abnormalities. With electronic monitoring we can get a reading of the heart rate and determine when the fetus is in trouble. With the development of tests such as amniocentesis, we can detect certain genetic diseases early in pregnancy. With new assisted reproduction techniques such as in vitro fertilization, many couples trying to conceive a child have been given new hope.



George D. Wilbanks, Jr., M.D., the John M. Simpson Professor and chairman of obstetrics and gynecology.

Hand in hand with these advances has come the evolution of a new subspecialty in obstetrics —maternal/fetal medicine—to manage high-risk pregnancies. During this same time, women and their families began to show an increasing interest in learning more about and becoming more involved in the birthing process, spurring the growth of family-centered care as an option for low-risk deliveries.

The latest in technology. Medical and nursing expertise. Educational programs. A supportive environment for individualized family-centered care. Each is a principal component of the new Perinatal Center at Rush-Presbyterian-St. Luke's.

With recent completion of a major renovation project, the new expanded Perinatal Center now covers the sixth floor of six connecting Medical Center buildings.

"The Perinatal Center has the latest medical technology and conveniences while preserving opportunities for individualized, family-centered care throughout the maternity cycle," notes George D. Wilbanks, M.D., the John M. Simpson Professor and chairman of obstetrics and gynecology.

"With this new Center we renew our commitment to our staff and the highest level of patient care."

The facilities include six labor/delivery/recovery (LDR) suites, each with its own bath and sitting area, decorated in a floral theme. The setting is purposely homelike to provide a warm, comfortable childbirth experience. But with

equipment stored in built-in cupboards, each LDR has the capability to deal with emergencies.

Electronic monitors for maternal vital signs and fetal heart rate are within immediate reach behind custom-made headboards of oak. Epidural anesthesia may also be provided should the patient desire. Following recovery the mother is moved to the adjacent postpartum unit which offers 20 private deluxe and 6 semi-private rooms.

Two family birth centers are also available as an alternative to those at low risk for any complications during childbirth. Also decorated in a floral motif, each suite includes a bath and separate lounge.

Should the need arise, both the LDRs and family birth centers are within immediate access of surgical delivery rooms, as are the two additional high-risk labor rooms for patients requiring "high intensity" care before and/or after delivery. In each of these areas, the nurse-to-patient ratio is one-to-one.

An antepartum unit includes four private and four semi-private rooms for high-risk patients who require hospitalization before labor and delivery. The general care nursery has beds for 39 normal babies.

"We've designed our new facilities to accommodate everything from having a baby in a homelike setting to caring for the most critically ill high-risk patients," Dr. Wilbanks says.

"In addition, the Perinatal Center at Rush serves as a state-designated tertiary care facility for a network of community hospitals. The Special Care Nursery remains an integral part of the Center, providing intensive and intermediate care for 42 high-risk newborns and support for their families.

"The major focus of perinatal care in the 1990s is to improve the outcome of pregnancy," Dr. Wilbanks adds. "Healthier babies. That is our ultimate aim."

Four Healthy Babies

Michael and Nancy Clancy, of Chicago's Beverly Ridge neighborhood, welcomed the 90s with their four healthy babies. The quads—Patrick, Daniel, Matthew and Caitlin—were born at Rush on New Year's eve.

Married for 12 years, Nancy and Michael, both 35 years old, had undergone fertility treatment with a medication called Pergonal.

"When I first found out that I was going to have four babies, I was happy, but worried about whether I would be able to carry them far enough along. I knew a woman who was expecting quads but she delivered in her 26th week (normal is about 39 weeks) and none survived."

Prematurity is the main complication of multiple pregnancy. Nancy had initially been receiving care at her local hospital, but as a high-risk obstetric patient she was referred to maternal/fetal medicine specialists at Rush through the Perinatal Network Program.

The babies were due March 1, but last November 7 Nancy was admitted to the antepartum unit at Rush for complete bedrest and close supervision of her pregnancy, under the care of Donna Kirz, M.D., assistant professor and assistant attending physician, obstetrics and gynecology, and associate director, maternal/fetal medicine.

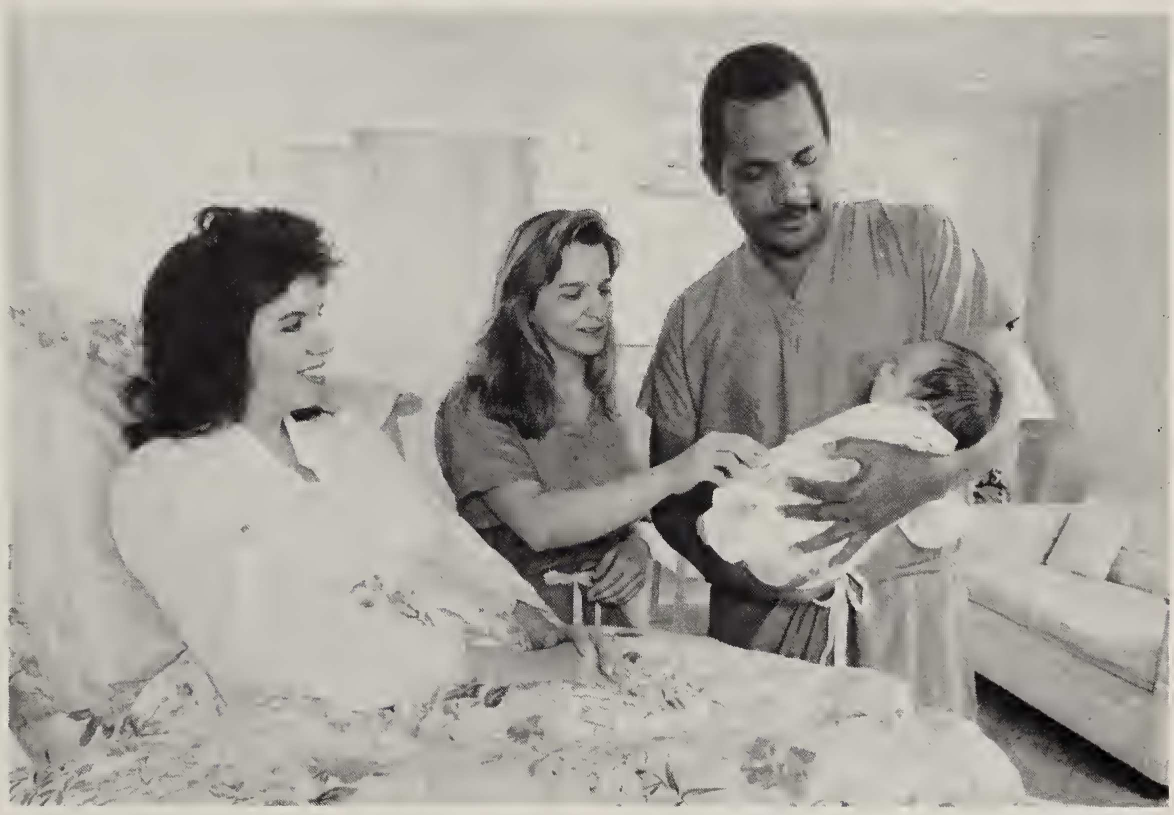
"Dr. Kirz told me that besides getting me four babies, she wanted to get me four healthy babies. That was her goal. And that's what happened."

The quads, delivered by Cesar-

Nancy and Michael Clancy with quads, Patrick, Daniel, Matthew and Caitlin.

"The major focus of perinatal care in the 90s is to improve the outcome of pregnancy."

George D. Wilbanks, M.D.



John Hobbs, M.D., and Maureen Kelly, M.D., with a mother and newborn in one of the birthing suites of the new Perinatal Center.

ean section after one of the bags of waters broke, ranged in size from 2 pounds, 15 1/2 ounces to 3 pounds, 10 ounces. They stayed in the Special Care Nursery, with Caitlin being the first to go home four weeks later, when her weight reached 4 1/2 pounds and she was able to maintain body temperature as well as suck, swallow and breathe in coordination. By February 7, all four were home with their parents.

"The doctors and nurses said I did a good job, carrying them far enough to where they were born healthy and just needed to grow a little bit more," Nancy says. "But I really owe it to them."

High-Risk Care

The medical team that delivered the quads was headed by Howard Strassner, M.D., director of maternal/fetal medicine and assistant professor, obstetrics/gynecology, who is also co-director of the Rush Perinatal Network.

As a regional perinatal center designated by the state, Rush serves 12 community hospitals, providing tertiary level care for high-risk obstetric patients and newborns, as well as medical and nursing consultations and outreach education. Specially equipped maternal and neonatal transport teams are on call 24 hours a day for community referrals.

"Between the center and network hospitals, there are about 18,000 deliveries each year," Dr. Strassner says.

"The development of regionalized perinatal centers is one of the major changes that has lead to the reduction of perinatal mortality in the state.

"Aside from this organizational structure," he adds, "there are a number of pivotal areas in the field itself."

New applications for diagnostic ultrasound continue to be developed, for example.

"Back in the late 60s when ultrasound was first introduced, we were just looking at shadows," Dr. Strassner notes. "Now we can see extraordinary fetal detail—eyes, mouth, bones. We can get accurate estimations of fetal weight; diagnose a variety of congenital anomalies; estimate adequacy of blood flow to the fetus and general state of fetal health."

With early pregnancy testing such as amniocentesis, a sample of the amniotic fluid which surrounds the fetus is withdrawn and the cells are analyzed in chromosome studies to detect genetic disease. Amniocentesis is also used for assessing fetal lung maturity. Chorionic villus sampling, which can be done even earlier in pregnancy, involves withdrawing a sample of the developing placenta which contains cells genetically identical to the fetus.

It's been just in the last few years that various methods of fetal biochemical testing have become available.

Dr. Strassner explains that "for very select patients with very difficult problems and extremely high-risk complications, we can now use ultrasound guidance to insert a needle into the umbilical cord while the baby is still in the uterus and get some samples of blood for a variety of tests." The procedure may be used for rapid genetic testing or to determine RH status or platelet count when the fetus is at risk for bleeding.

Testing has also been developed to determine fetal blood gas levels during labor. "If the fetus is getting

Frank Merrick,M.D., examines an obstetric patient nearing full term.

too little oxygen, there is a buildup of acid in the blood," Dr. Strassner explains. "This kind of testing can diminish the number of Cesarean sections performed for suspicion of fetal distress."

Overall, more than half of all obstetric patients at Rush have some high risk factors. They range from those with predisposing factors such as hypertensive disease and diabetes to those critically ill due to the pregnancy.

"Nurses at Rush are meeting the challenges of some very sick obstetric patients who, if not pregnant, would be in intensive care units," says Sarah Naber, C.N.M., Ph.D., associate chairperson and assistant professor of maternal/child nursing.

"We've had women on renal dialysis in this department; we've had women on central line and triple lumen catheters. Twenty years ago, the obstetric nurse just knew obstetrics and knew it very well. Today, her expertise and responsibilities cover a much broader range."

Nurses certified in fetal monitoring by the Nursing Association of the American College of Obstetricians and Gynecologists conduct antepartum testing on high-risk patients who do not need to be hospitalized.

In the non-stress test, fetal monitors are attached to the abdomen and the mother is told to signal when she feels a kick, which should coincide with a rise in the fetal heartbeat. Two other procedures—the contraction stress test and the oxytocin challenge test—involve stimulating contractions by prodding touch or IV medication to determine how the baby will withstand labor.

"Because of this kind of technology, we're able to do a much better job of monitoring pregnancy progress and how the babies are withstanding any stresses," Dr. Naber says.

State-of-the-art technology is featured in the Perinatal Center's new system of continuous monitoring. Three complementing systems are tied together to provide a constant assessment of maternal and fetal vital signs and to collect and archive all the data automatically.

Monitors are set up in each LDR (for use as needed), as well as in the antepartum unit, high-risk rooms, operating rooms, post-anesthesia recovery room and intensive care nursery.

Monitors are linked together and also tie into a central station where vital sign information on any patient can be viewed. Each monitor has the capability of switching to and observing any patient reading.

This new system has some additional advantages, according to Jane Hagele, M.S., M.B.A., R.N., unit leader, labor and delivery.

"With the new system, if a baby starts to tire during labor or have some other problems that indicate the need for intervention, everyone in the unit will be alerted because that information will automatically flash on all screens. The archiving feature also makes sure that we will always have these records, which is important not only from a legal point of view, but for statistical purposes and for education."

Almost all the nurses in the department hold at least a bachelor's degree. According to Dr. Naber, "the level of nursing required and the need for college preparation go hand in hand.

"Baccalaureate nurses have the educational background necessary for good psychomotor *and* psychosocial skills," Dr. Naber explains.

"We rely on our nurses to be good at assessing the particular wants and needs of individual patients and their families so that they can be supportive. Increased patient involvement in the childbirth process presents a special challenge," she says.

"For the most part, these patients are normal healthy people who want to experience childbirth without any interventions. While we support that, we also have a responsibility to interpret to them when it is necessary to intervene—to use monitors, for example."

Educational Programs

To prepare for the childbirth and child rearing experience, women and their families can take advantage of the Perinatal Center's broad

"Ours is not just a birthing room but a whole philosophy of non-intervention."

Frank W. Merrick, M.D.

educational program which offers classes and counseling in pregnancy, high-risk pregnancy, genetics, pain management choices, delivery and postpartum care, breastfeeding, parenting, sibling relationships and grandparenting.

Teaching is not limited to the formal classroom setting, notes Mary Beth O'Holleran, R.N., unit leader, antepartum, postpartum and general care nursery.

One of the special services offered to new mothers on the unit is the lactation consultant program.

According to O'Holleran, "what sets our program apart from many others is that it is staffed by registered nurses, two of them with master's degrees, and all four of them board certified specialists."

A consultant conducts rounds on the unit each day, to teach new mothers how to begin and maintain breastfeeding. Individual patient problems, such as a sleepy baby or poor feeder, are also addressed. Follow-up continues as necessary by telephone after discharge. One Saturday a month, a breastfeeding class is offered to prenatal patients.

A monthly class is also held on the unit for children aged three and older who will soon have a new baby brother or sister. The youngsters get a tour of the facility and see a movie about having a new baby in the family, which triggers an open discussion on topics such as sharing, safety and what they can do to help care for the new arrival. Using a doll they practice how to hold an infant and end the class by coloring a picture for the new baby.

Family Birth Center Program

The Family Birth Center, established at Rush 10 years ago, has the distinction of being one of the first such programs in the city.

Frank W. Merrick, M.D., senior attending, and assistant professor, obstetrics and gynecology, and one of the program's founders, describes it as a "true alternative birthing center" that can be offered to any prenatal patient who has no significant risk factors.

The program was designed in response to a growing interest in "eliminating routine medical interventions and having a quiet birthing place as a way to enhance labor and the bonding process between mother, father, baby."

"Ours is not just a birthing room but a whole philosophy of non-intervention," Dr. Merrick explains. "Patients can make their own delivery plan and we try to adhere to it as long as it seems reasonable and safe for mother and baby." Childbirth preparation classes are a requirement.

"We encourage patients to use whatever position is comfortable for them—sitting in a rocker, kneeling on the floor, walking the halls," says birth center nursing coordinator Lynn Kroeger, R.N. "Many find the shower massage very comforting and relaxing."

Maternal and fetal well-being are closely watched and carefully assessed. In case of an emergency, patients have full advantage of the complete range of services and facilities at the Medical Center.

For many who use the center, the birthing experience is a family affair. Siblings who attend a preparation class are also allowed to participate.

Howard T. Strassner, M.D., checks the fetal monitor in the delivery room of the new Perinatal Center.

Mary Coughlin, R.N., labor and delivery nurse, with a new arrival.

Some want practically their whole families there—mothers, fathers, aunts, uncles, brothers, sisters—just as it used to be in days gone by. "It helps to relax them and give them confidence that everything will be fine," Dr. Merrick says.

"In the last 10 years we've had quite a few nice deliveries in the birthing center. It's become sort of a place of renewal for some of us in obstetrics. Many go into the field for just this type of experience."

Nurses provide one-on-one teaching with each new mother to make sure that she is comfortable with taking her newborn home and understands how to take care of herself as well as the baby. Birthing center nurses follow up with a phone call and then a home visit for mothers who go home within 24 hours of delivery. Mothers also have the option of transferring to the postpartum unit for the traditional two-to-three-day stay.

Special Care Nursery

Over 3,000 babies are born at Rush each year. Newborns who are at high risk due to prematurity, complications or congenital defects are admitted to the Special Care Nursery, which also serves community hospitals in the Rush Perinatal Network.

Werner Meier, M.D., associate professor, pediatrics, assistant professor, obstetrics/gynecology and director of neonatology, heads the Special Care Nursery which includes neonatal intensive, intermediate and transitional care. Dr. Meier is also a co-director of the Rush Perinatal Center Network.

"In addition to providing tertiary level care," says Dr. Meier, "a major role for us is to work very closely—in consultation, continuous dialogue and educational case conferences—with obstetricians both at Rush and at the community hospitals in the network to prevent factors that may bring babies to the Special Care Nursery."

Infants who created a lot of challenges in late 60s and early 70s were those who weighed about 1500 grams.

"These were babies with a mortality rate of over 50 percent and a very significant number of survivors suffered from cerebral palsy, scarring of the retina which resulted in blindness or low intellectual capabilities."

Today these infants have a survival rate of about 98 percent and their chances for "normal" survival is over 90 percent.

What changed?

Dr. Meier singles out several advances in technology. First is our ability to nourish these babies. IV fluids provide proteins, glucose, minerals and vitamins that allow babies to recover and develop and grow. Most premature babies (which accounts for a large number of babies in the Special Care Nursery) have respiratory insufficiency due to immature lungs or immature surfactant in the lungs. It is now possible to ventilate these infants mechanically until they can produce enough surfactant naturally. Also available are surfactant materials that can be instilled directly into the lungs of some of these infants. With better diagnostic methodology, infectious disease can be detected and dealt with at an earlier stage. Better antibiotics are also available.

"All these procedures and different managements are possible today because we can follow laboratory values in these babies from micro samples of blood. We can do things today that we couldn't even dream of in the past.

"In many ways the challenges we face today are similar to those of the 70s, but now we are dealing with babies who are much more premature and in much lower weight ranges—as low as 500 grams."

In addition to advances that increase survival, we are also learning more about how to decrease complications of therapy. The new facilities for the Special Care Nursery include a number of special features which incorporate some new findings.

To eliminate adverse effects due to excess overhead lighting, the new unit was designed to allow for flexibility in lighting. Rather than an overhead glare, lighting shines from the sides and can by regulated from one patient to the next.

> *"Twenty years ago the obstetric nurse just knew obstetrics ... Today, her expertise and responsibilities cover a much broader range."*
>
> **Sarah Nabor, C.N.M., Ph.D.**

New equipment allows for improved monitoring and maintenance of appropriate levels of oxygen therapy and changes have been made to reduce noise levels.

Some special care infants are so sensitive to sharp sounds that slamming the incubator's door causes a drop in the heart rate. Ringing phones, loud voices and alarms have the same undesirable affect. A new two-way communication intercom allows for staff to communicate in soft tones. Phone tones have also been adjusted and flashing lights rather than sharp sounds signal a monitor alarm.

In addition, the Special Care Nursery now includes an overnight stay room for parents to practice caring for their baby before they take them home. These accommodations allow parents to become comfortable and confident in dealing with their babies.

Addressing Problems in Infertility

Essentially all the techniques used in infertility treatment today have been developed within the past 10 years. The notable exception is induction of ovulation (with medications such as Clomid or Pergonal), the mainstay of infertility treatment which was developed in the 60s.

Infertility treatment programs got under way at Rush nearly 10 years ago and in that time about 1,000 conceptions have been achieved, according to Ewa Radwanska, M.D., professor, obstetrics/gynecology and director of reproductive endocrinology and infertility.

Ewa Radwanska, M.D., with Rush's first IVF baby, Tiffany Autrey, 5, and first ZIFT baby, Kellie James, 4 weeks.

Sometimes misnamed a "test tube baby" program, in vitro fertilization (IVF) contributes to improved conception rates. The Rush In Vitro Fertilization Program is the most successful of its kind in the Chicago area, with more than 50 babies born to date.

In IVF, egg cells are retrieved from the ovaries, fertilized in the laboratory with the husband's sperm and then returned into the uterus. For women whose fallopian tubes are missing or damaged, it offers new hope to conceive a child.

When the procedure was first introduced, egg retrieval involved surgery called laparoscopy. "With new technology," says Dr. Radwanska, "it can easily be done under ultrasound guidance by inserting a needle into the vagina, and aspirating the eggs from the ovary. It doesn't even require anesthesia."

A procedure called Gamete Intrafallopian Transfer (GIFT), introduced just a few years ago, involves aspirating egg cells, adding sperm and then placing the mixture into the fallopian tubes so that fertilization can take place in the body, which results in higher pregnancy rates.

The best success is expected for the newest technique, called Zygote Intrafallopian Transfer (ZIFT) which involves aspirating egg cells, fertilizing them in the lab and allowing them to reach just the zygote (a very early) stage of development before placing them into the fallopian tubes for a natural transfer into the uterus.

"A main progress in fertility treatment is accuracy," Dr. Radwanska says. "We're actually able to see, measure, and place things such as eggs and sperm with less guesswork."

Artificial insemination success rates have improved with development of new techniques to process the sperm and use them in a concentrated form for insemination into uterus or tubes.

"In the 70s," notes Dr. Radwanska, "surgery was the main emphasis for infertility treatment, with the focus on techniques that minimized scarring and adhesions to enable the patient to become pregnant.

"In the 80s, efforts were mainly directed at replacing major surgery with minor surgery. For example, a malformation of the uterus called septum, which causes infertility and miscarriages, used to be treated through abdominal surgery (metroplasty). Now it is routinely done through outpatient hysteroscopy with a fiber-optic light. This procedure is at least as successful as major surgery, and doesn't cause as much discomfort to patient."

Ectopic (tubal) pregnancies resulting from infertility treatment can now be diagnosed as early as the fifth week, before the fallopian tube ruptures, because of advances such as measurement of hormones in blood and ultrasound monitoring.

"One can now plan for a minor procedure to remove ectopic pregnancy as opposed to being at the mercy of an emergency situation," Dr. Radwanska says.

"In the next decade, I expect we'll see an emphasis on using micromanipulation of eggs and sperm to make them join together.

"Now it's coming down to the question of what can we do for patients in which all these new advanced techniques have not been met with success."

The Best in Patient Care

In the explosion of technological advances in obstetrics, what remains constant is the Medical Center's steadfast commitment to providing the best in patient care.

"Patients get better care today than ever before and there is no way I would want to turn back the clock," says John S. Long, M.D., senior attending physician, and assistant professor, obstetrics and gynecology, who has delivered more than 12,000 babies in more than 40 years of practice.

"It's true that technology accounts for the greatest change in obstetrics, but I still try to teach residents that it is only an aid in diagnosis and treatment.

"And there's still place for the compassionate doctor to sit and listen to his patient."

Gynecologic Research at Rush

Rush-Presbyterian-St. Luke's Medical Center is making significant contributions in gynecologic research in areas such as combating herpes; the human papillomavirus (genital warts); and gynecologic cancer, including ovarian cancer. The following is an overview of some of the research being conducted at the Medical Center, and its results.

Gynecologic Cancer

Not since Betty Ford went public with her fight against breast cancer has there been such public awareness of a potentially life-threatening disease that strikes women. The topic: ovarian cancer.

First, comedian Gilda Radner's book, *It's Always Something*, which detailed her own fight against ovarian cancer, and then her subsequent death last spring, brought the subject to the front pages of newspapers. More recently, the topic was in the news again when a lead character on the ABC television show, "thirtysomething," discovered she had ovarian cancer.

"Ovarian cancer is a difficult disease," says Edgardo Yordan, M.D., assistant professor, obstetrics and gynecology, and director, Section of Gynecologic Oncology. "It doesn't present early symptoms, so people come in at a more advanced stage, like Gilda Radner. But essentially, people with ovarian cancer now live longer. In the years before chemotherapy, they died within six to 12 months; now they live four or five years and some cancers never recur. Even for those with advanced ovarian cancer, 80 percent of them are alive two years later. In the past, they would be dead within six months."

How likely is it that a woman will develop this disease? According to Dr. Yordan, of women born today, it's expected that one in 70 will develop ovarian cancer. "And it's rising," he says. "No one knows exactly why. It's possible that a viral type of infection causes cancer, but obviously that's not the whole answer. Lifestyle, sexual habits and changes in birth control may also come into play, but these are subtle things. It's not easy to peg a cause on it."

Factors such as obesity and delayed childbearing can increase a woman's possibilities for having a gynecologic cancer. "Women who are at high risk for endometrial cancer, ovarian cancer—and even breast cancer—are women who have had their pregnancies late in life, who have relatively few pregnancies, or are obese," says Dr. Yordan. "Other factors are changes in the female hormone and the environment. These are all things that can predispose you to gynecologic cancers. They are not the cause of it, because not everybody who meets these criteria will develop cancer, but they certainly are predisposing factors.

"These are the diseases of civilization."

Dr. Yordan is spearheading research at the Medical Center to combat better advanced gynecologic cancers such as cancer of the uterus, cervix and endometrium (lining of the uterus). One modality he's currently working with is giving patients a combination of radiation therapy and chemotherapy simultaneously. "Radiation therapy is, of course, an old modality," Dr. Yordan says, "but there's a limit to how much radiation you can use against a tumor. So we're attempting to get more mileage out of the permissible dose by combining it with chemotherapy; it perpetuates the effects of the radiation.

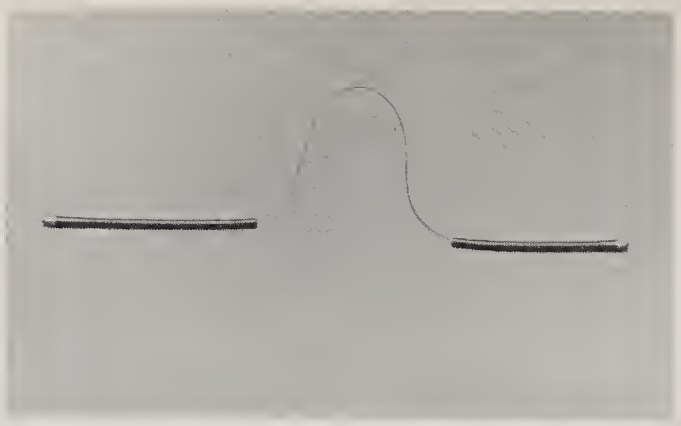
"Patients have tolerated it very well. We use it for patients with advanced cancers whose outlook is zero, and we've had some very promising results. In some categories of cervical cancer we've had close to a 100 percent response rate. That's a category where we'd expect dismal result rates if we had just applied conventional methods."

Another technique that's being explored is intraoperative radiation therapy, which consists of applying radiation in an operating room setting. Typically, when radiation therapy is administered, normal tissues such as the bladder and bowel are also radiated, due to their proximity to the tumor. In intraoperative radiation therapy, the patient is opened up and her bladder and bowel can be moved out of the way. "This way, we can give a really hefty dose to the tumor, and that has a better chance of impacting the disease," says Dr. Yordan.

Rush is one of the first institutions in the country to perform this operation, and has been doing so since 1982. The results are promising, but it is too early to tell what kind of effect it has on long-term survival.

Another novel means of combatting gynecologic cancer that is somewhat similar to intraoperative radiation is intraperitoneal chemotherapy. Rather than opening a patient up and applying radiation directly, the patient receives chemotherapy inside the abdominal cavity by direct infusion.

Dr. Yordan, in collaboration with Herbert Kaizer, M.D., Ph.D., the Coleman/Fannie May Candies Foundation Professor and director of The Thomas Hazen Thorne Bone Marrow Transplant Center, is beginning to explore the use of marrow-lethal chemotherapy to fight advanced ovarian cancer. "In chemotherapy, the doses are limited



The shug — male contraceptive device

by how much a person's bone marrow will take," explains Dr. Yordan. "If you wipe out the bone marrow by giving a much higher dose to the tumor, you then have to replace the bone marrow with a transplant.

"What can be done is to take bone marrow out of the patient, store it, give the high-dose chemotherapy, wipe out the remaining bone marrow, and then reinfuse the patient's own bone marrow. This is a way of bridging one of the main limitations of chemotherapy; you can give a much higher dose. You don't have to worry about the bone marrow because you restore it afterwards."

"We were one of the first in the world to use marrow-lethal chemotherapy in gynecologic cancer," says Dr. Yordan. "It's a modality we are using more frequently in advanced cancer situations, because those women have so little to hope for. They have everything to gain and nothing to lose by using these aggressive modalities."

Herpes and human papillomavirus

The Department of Obstetrics/Gynecology is testing a herpes vaccine which may or should be a major preventative of genital herpes. It is thought that not only will the vaccine prevent the sexual partner of those who have herpes from contracting it, but may also prevent recurrence of herpes in those who already have it. Results of the study are expected to be announced sometime in April.

George D. Wilbanks, M.D., the John M. Simpson Professor and chairman, obstetrics and gynecology, has been working on the vaccine with Constance Benson, M.D., assistant professor, internal medicine, Section of Infectious Disease, and Gordon Skinner, M.D., University of Birmingham, England. At first it seemed the vaccine might prevent cervical cancer, as has been shown in animal studies, but recent data have now shown that genital herpes is not as strong a factor in causing cervical cancer as once thought.

Herpes is a common virus which is best known for producing cold sores or fever blisters. This is Type I, the oral cold sore virus. A similar virus, but a different type, Herpes Simplex Virus Type II, causes painful blisters to the genital area and may also cause flu-like symptoms such as fever and chills. Pregnant women who have an active infection at the time of delivery can possibly pass the disease on to their newborn. Herpes may be fatal for infants, who are much more susceptible to the disease.

"In over half the cases of genital herpes, it's chronically recurrent; it can come back anywhere from once a week to once every six months or so in a high percentage of patients," says Dr. Wilbanks. "It's painful, and can cause the person to miss work. It can be transmitted sexually, so it can cause problems in marriages or in your sexual relationships. Genital herpes can cause a lot of mental anguish."

It is estimated that over two million people have genital herpes. Exact statistics are not known, because many people don't report it or seek medical help. "Essentially, because we have no way of curing the disease, the number of people who are getting it just keeps growing," says Dr. Wilbanks.

The vaccine on which Dr. Wilbanks and his colleagues have been working consists of three injections received over three months. "It's made from the coat of the virus," he says. "The virus has a DNA center, and something like a 'nutshell' on the outside. What we've done is gotten rid of the DNA, or the infectious part of the virus, and used the 'shell' as the vaccine."

The vaccine has worked well in both animal and human studies. At the time *The Magazine* went to print, data on the studies were almost complete and analysis was beginning.

A sexually transmitted disease that is considered even more of a threat than herpes is the human papillomavirus, or genital wart virus. "This does seem to be getting almost to epidemic proportions," says Dr. Wilbanks. "There have been a couple of health reports from clinics at universities where a third of the young women who have no symptoms will have findings of the human papillomavirus DNA in their genital tract. And there's a very strong correlation between this virus and cervical cancer. This disease can be very extensive, so the physician ends up treating the whole vulva outside, the vagina, the cervix. Our concern is that if we're finding this many young people with the virus infection now, how many cancers are going to develop in 10 years?

"And we're finding this in a fairly high number of asymptomatic women, who have no lesions. We do an HPV smear like a pap smear, and, depending upon the age of the population, we find usually less than five percent. However, in sexually active young people, we may find that up to 25 percent have the virus DNA."

Those who are symptomatic, who do have warts, can find them very painful. Some, however, inside the vagina or on the cervix may not be noticeable at all. It's easier for a man to give it to a woman than vice versa; men seem more resistant to

> *"... we don't take already partially developed ideas and then develop them further... we start from scratch."*
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> **Lourens Zaneveld, D.V.M., Ph.D.**

getting the virus.

Dr. Wilbanks, along with Dee E. Fenner, M.D., assistant professor, obstetrics and gynecology, is studying cofactors involved in the virus. "The virus seems connected to early sexual relations and multiple sexual partners," says Dr. Wilbanks. "We're also concerned about the role of smoking, and about hormones—how the 'pill' affects it.

"We've known about this virus since the late 70s. However, it wasn't until the DNA was cloned in Germany that we could really identify that there is a virus there. So it's been in less than the last 10 years that this has come to the fore. It's a pretty hot issue now."

Creating Better Contraceptives

Lourens Zaneveld, D.V.M., Ph.D., the Harry Boysen, M.D. Professor, obstetrics and gynecology and director, Section of Obstetrics and Gynecological Research, has a unique job. He's an andrologist who studies the diseases of men, especially those that affect the male genital organs.

"The major goal of the laboratory is determining what makes spermatozoa tick," he says. "Basically: how they're produced; how they get transported in the male genital tract; their characteristics, both from a physiological and biological standpoint; how they get transported through the female genital tract, and how they fertilize eggs.

"Most people think it's simply a matter of the sperm wiggling its way to the egg and then into the egg. But nothing can be further from the truth. It's a very complicated biochemical process.

"Once we know what is involved in the fertilization process, we can use this information to develop improved methods to assist women to become pregnant, or improved methods to prevent conception."

One contraceptive device that Zaneveld's laboratory has developed for males is called the shug. Two silicone plugs placed in the vas deferens—the tube that runs from the testes to the penis—block the path of the sperm, almost like a temporary vasectomy. The implanting and removal of a shug is a simple procedure that could be done in a doctor's office, under the same conditions as a vasectomy. The shug is still being evaluated and undergoing clinical trials. Dr. Zaneveld cautions that development is still in the early stages and that it could be at least another five years before the device would even be available to the public.

Another contraceptive study is for a post-testicular male contraceptive. A male would be able to take a pill and know that four hours later he would be temporarily sterile; his sperm would be dead. He would again become potent after 24 to 48 hours.

"When a man takes the contraceptive, it winds up in his ejaculate and kills the sperm," says Dr. Zaneveld. "We have shown that this can work, except it is too toxic in its current form for use on a regular basis. We're working with an organic chemist, Ludwig Bauer, Ph.D., at the University of Illinois, to develop compounds that are equally or more effective but a little less toxic."

In studying conception, Dr. Zaneveld's laboratory is developing ways to look at the inside of a sperm. "Traditionally, to judge an infertile male, you'd do it by semen analysis," says Dr. Zaneveld. "You'd look at the number of sperm, the shape of the sperm, the way the sperm wiggles. But that's like looking at a person and saying, well, if you look normal and you walk normal, you're normal. But inside, you could be dying of cancer. The same with sperm. The former way was a very primitive way of looking at sperm.

"Now, we're looking on the inside of the sperm, studying its chemical composition. We're working on ways to get a better idea of whether the man's fertile."

The laboratory is also working on a capsule to protect the embryo during the first hours after being placed in the uterus following an in vitro fertilization. According to Dr. Zaneveld, when a fertilized egg is placed into the uterus, there's a chance it will be expelled because it's so small; the uterus may view it as a foreign body and reject it. "With a capsule around it, it's a little more protected," says Dr. Zaneveld. "The embryo will have a chance to develop before the capsule dissolves, spontaneously. Then the embryo will be more mature, so it won't be as susceptible.

"Most of what I do is in the developmental stages," he concludes. "In my laboratory, we try to be innovative. Innovative means we don't take already partially developed ideas and then develop them further; it means we start from scratch. We develop them to a certain stage, and then enlist others' help.

"Out of possibly 20 ideas, maybe actually one will make it to the clinical stages later on. But to me, that's exciting, to study an event in process, to come up with new ideas."
N.S.

New Plans for Heart Care/ Research Continue a Rush Tradition

Despite early detection, early intervention, improved therapies and greater public awareness about dietary and other factors which put one at increased risk for developing heart disease, heart disease remains the nation's number one killer.

Rush-Presbyterian-St. Luke's has a long history of providing state-of-the-art clinical care for heart patients of all ages. Last year, however, the process of revamping and expanding all heart care programs at the Medical Center began with the hiring of a new cardiology section chief, Joseph Parrillo, M.D.

Dr. Parrillo came to Rush from the National Institutes of Health, where he spent 10 years as a prolific heart and critical care researcher. He has been named the James B. Herrick, M.D. Professor of Heart Research and, in addition to directing cardiology, serves also as chief of the newly created Section of Critical Care Medicine. He spoke recently with The Magazine *staff writer, Carolyn Reed, about heart disease and his program plans for Rush.*

Q. *In the last decade the incidence of heart and blood vessel disease has decreased something like 24 percent.*

Is it really true that we've licked heart disease?

A. I think this is a common feeling. However, heart disease is still far and away the most common cause of death in populations in the United States and Western Europe. Every year a half a million people die of heart attacks. And another two or three hundred thousand will develop serious strokes.

So we're still talking about a disease of immense proportions. Something like five million people have had a heart attack and half of those are disabled from it. They can't work or do anything because of it. So we're really talking about something that has a major impact on the population.

Furthermore, there are a number of other cardiovascular diseases that don't get very much press that are serious to the people who get them—they're catastrophic.

For instance, cardiomyopathy, in which the heart muscle itself is seriously damaged; people develop heart failure or rhythm disturbances from it. This is a disease that affects all ages—children, teenagers, people in their 20s, 30s, 40s, as well as people in the upper ages in life. One form of cardiomyopathy, dilated cardiomyopathy, is the most common underlying disease that necessitates heart transplantation in America today.

And there are still other forms of heart disease like hypertrophic cardiomyopathy. We understand very little about what causes the problem and we only have some relatively modest medical therapies that work.

Q. *Do we really even understand the process of how atherosclerosis develops?*

A. Oh, no; definitely not. Furthermore, we don't understand really how to prevent it. We know that stopping smoking, controlling high blood pressure, and changing one's diet probably reduce it, but we should be clear on this. Even though we've had a 20 percent reduction or so in the incidence of this condition, in my judgment this does not represent just changes in diet. I think it represents the fact that we treat people who have had heart attacks with much better drugs.

When I went to medical school, if you had a heart attack and made it

"…a half a million people a year (are) dying of heart attacks…we're still talking about a disease that's very common and very deadly."

Joseph Parrillo, M.D.

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to a hospital, the chances that you would die in the hospital from that heart attack were something like 36 to 38 percent. Coronary care units reduced that mortality to around 15 to 18 percent. And now with thrombolytic therapy—therapy aimed at dissolving the clot that is causing the obstruction to blood flow—the mortality is approximately 7 to 8 percent. Most of the people who are dying now—instead of dying of the things they were dying from 30 years ago—have a different problem. They've lost too much heart muscle, and they go into a heart failure state that can't be treated.

So we've made a big difference not only in changing people's habits, but also in the acute therapy for the disease itself. Nonetheless, there's still a half a million people a year dying from heart attacks alone. So we're still talking about a disease that's very common and very deadly.

Another cardiovascular disease that deserves more attention is shock. The blood pressure becomes too low and the cardiovascular system develops serious abnormalities because one doesn't have a high enough blood pressure. Shock due to an infection—septic shock—probably takes the lives of two to three hundred thousand people a year.

Q. *Do you think if you understood the mechanisms involved better in an illness like septic shock you'd understand other things about heart disease better?*

A. Definitely. Septic shock really is a disease that affects everything. But the abnormalities that kill you are in the vasculature and the heart. So it's a cardiovascular problem. It's the vasculature that gets destroyed and the heart itself that doesn't function correctly. And this is a disease that has been increasing since the 1930s in a linear fashion.

Q. *Do we know why that's happening?*

A. There are probably a lot of reasons. One is that a lot of our therapies for other diseases—like cancer—damage the immune system. So people who have arthritis and go on to corticosteroids; people who have other forms of inflammatory trouble who receive immune suppression; people who get transplants like kidneys, hearts; people who have cancer chemotherapy—all become susceptible to infection.

In addition, we use a lot of different devices in medicine now. People have prosthetic devices put in their joints, they have a catheter in their bladder. Though important advances, all of these things can get infected. It's not a common problem, but it occurs in 1 percent of all of these devices. Septic shock is the most common cause of death in intensive care units in the United States—by far. In the ICU setting, it kills two to three times as many as any other single cause of death. And understanding the disease really requires understanding the cardiovascular system and its response to serious infection.

Understanding heart depression during septic shock is probably similar to understanding the response that you see during a heart attack—myocardial infarction—and that has similarities to the damage that occurs in dilated cardiomyopathy. The body can only injure an organ a handful of ways, and if you increase your understanding of one disease, you enhance your knowledge of another. You have to think of cardiovascular disease in a really broad spectrum. For instance, in shock, one of the major problems is in the lining of the vessels and in atherosclerosis one of the major problems is how does the atherosclerosis damage the lining of the vessel. You're talking about really the same area and probably there are very similar mechanisms going on that are involved in it.

Q. *In the work that you will be doing here at Rush are these some of the questions you're going to be looking at?*

A. Yes. We plan to have a very broad-based program, a very comprehensive program, which I think is essential for an academic, large city-based hospital that basically handles everything. When patients come in to you, you honestly don't know what they're going to need in order to manage their situation.

We plan to have a strong preventive cardiology program, including a comprehensive risk reduction. The 11th floor of the new Professional Building is going to be an outpatient facility where a patient can be evaluated comprehensively: a one-stop shopping arrangement so that, short of needing cardiac catheterization or an invasive study, a patient will be able to come in the morning and several hours later, after a full evaluation, we will be able to tell that patient where he/she stands.

Further, we are making a commitment to the finest care of the sickest, most complicated patients. We're talking about the type of patient that requires a very sophisticated physician staff, a very sophisticated nursing staff,and very sophisticated technological capability. Most hospitals don't have this.

We are building four new intensive care units, all of which will be together, contiguous to one another, on the second floor of the

"... there's a real tradition here at Rush of trying to find out the answers to the most important questions facing cardiovascular disease."

hospital. There's going to be a coronary care unit with 10 beds, a coronary step-down unit with 22 beds, a 16-bed medical ICU and a pulmonary step-down unit with another 10 or 12 beds—a total of 60 or so intensive care beds Also, we plan to have a procedure room in the ICUs for doing procedures right there and a laboratory right in the ICU. I think we will have as sophisticated a critical care arrangement as is available really anywhere in the world.

Q. *Is this similar to what you had at NIH?*

A. What I had at NIH had all of these capabilities but it was a small unit. At NIH we only saw a relatively narrow spectrum of patients. This new unit at Rush is designed to handle any medical patient—from someone who's had a neurological injury to somebody who's got a cardiac problem to somebody who's got a kidney problem or multi-organ system failure.

Q. *Why did you decide to come here? What's the major appeal of Rush?*

A. The answer to your question is complicated. But there are a few important variables. The major innovation in American medicine, the major new changes, the creative new ideas are largely products of large academic hospitals that are affiliated with medical schools. The combination of the medical school with its research/education emphasis, and the hospital with its patient care emphasis—has really produced the revolution that we've seen over the last 50 to 80 years in medicine. It's extraordinary what has happened. And one of the beauties of it is that the patients that you see and the problems that you see on the hospital floor bring up the questions that are pondered by the investigator and then the investigator goes back to try and answer them. And although NIH is a wonderful place, it is not an academic/university hospital/medical center in the middle of a city that sees a variety of people.

And it's not where I trained and grew up. I grew up at New York Hospital (Cornell) in New York, and at Massachusetts General Hospital in Boston. To me these institutions, like Rush, are examples of places where clinical research of the highest caliber should be done. I like this environment.

The second point that I would make is that the emphasis at a place like NIH, after a while, is much more research oriented than it is clinically oriented. And I'm one of those people who sits somewhere in between. After spending 10 years in a largely investigative environment, I really wanted to be in an environment that was more clinical, and this institution is very interesting in that regard. We have a real tradition. Dr. James B. Herrick was here at the turn of the century, and he made an observation that coronary occlusion, coronary thrombosis, was associated with heart attack. It turns out, you know, 70 years later, that in fact, he was absolutely correct. And I think that it's important to realize there's a real tradition here at Rush of trying to

Joseph Parrillo, M.D., medical director of the Rush Heart Institute.

"The major innovation in American medicine, the major new changes, the creative new ideas are largely products of large academic hospitals that are affiliated with medical schools."

find out the answers to the most important questions facing cardiovascular disease. The first cardiac catheterization in Chicago was done here; Dr. Orman Julian—one of the first cardiac surgeons in the Midwest—was on staff here. That tradition was a piece of what made me come here. Another factor in my decision was the unique capabilities of the Rush Heart Institute.

Q. *You don't see anybody else really already doing this?*

A. There are other places that certainly have something called a heart institute. What will make the Rush Heart Institute unique is that it is going to be truly multidisciplinary. That is, cardiologists are going to work with cardiac surgeons, cardiac radiologists, cardiac anesthesiologists, and pediatric cardiologists. In addition, nurses who are interested in critical care, physicians who are interested in care of the critically ill, but who are not necessarily cardiologists per se—will come together in this heart institute concept. The cardiac surgeons and cardiologists will work together very much hand-in-hand.

A second concept of the Rush Heart Institute is that it's going to be comprehensive. We're going to be able to handle a patient's every medical need from critical care to coronary angioplasty, to cardiac surgery to convalescence, to reeducation and risk reduction. We plan to provide comprehensive care at a sophisticated level.

The third concept of the Rush Heart Institute is to combine this multidisciplinary comprehensive approach with the most advanced research.

For many people who come in with a cardiac problem, we don't have a good answer to what they've got wrong with them. We don't have the ideal therapy for them. However, there are possibilities on the horizon that may well work. We will have a number of new therapies available and we will do our best to choose whichever one was most applicable to that particular patient.

If you go to your regular community hospital, you'd get good therapy up to the point where medicine has gone. We're talking about going beyond that into the research field and providing the very best new therapies and technologies on the horizon. Now, some of these things will be effective but some may not work. But they need to be tried out. Clinical investigation is going to be a big part of the Heart Institute.

Q. *Can we talk a little bit about some of the people you have recruited already and some of the types of people you're going to be looking for to staff your program?*

A. The specific people that we're looking for are those who are very committed to patient care, but who also enjoy training other physicians, and, finally, have a major interest in pushing back the frontiers.

If we don't do research, then we'll stand where we are. Our technology in 1999 would be the same as 1989. We have to continue to innovate. Research is essential and is really the lifeblood of American medicine. So you have to hire someone who not only has this interest in patient care and in training, but also who can do research, who has shown that he/she knows how to define a problem, how to answer that problem, and then how to communicate what they find to other people and communicate it well. That particular kind of physician accounts for under 5 percent of all physicians who are trained.

Q. *Are these people M.D.s, Ph.D.s or both?*

A. Both, in some cases, but largely M.D.s who have gone to academic medical centers, who have been turned on by the idea that medicine is a changing field, and who would like to be part of producing that positive change. I must admit these are not easy persons to find, identify, and bring to your institution.

Q. *Aren't there two new people in particular that you've just brought on recently?*

A. Yes, there's Dr. Gary Schaer who is interested in cardiac catheterization and specifically, invasive technology. He's got a big interest in angioplasty, to open up closed arteries using balloons, lasers, and other techniques. We have a number of protocols getting underway to study which laser angioplasty technique is best, in which situations it works the best, where should you use it, where shouldn't you use it. And if you use it, what's the long-term effect: how do these patients do in a few days, a few months? These are all absolutely critical questions. And the answers to them right now aren't known.

Then there's Dr. Tom Buckingham.

Q. *And what does he do?*

A. He's an electrophysiologist. Whereas Dr. Schaer is interested in the coronary arteries and their effect on blood flow and how to open up those coronary arteries, Dr. Buckingham's major interest is in the electrical system of the heart.

The heart has its own electrical system and its own nervous impulses; a heart will beat even if you cut all the outside nerves. It has its own conduction system. That conduction system is affected in almost all of the heart diseases we've talked about. Many times it is a rhythm disturbance that causes a

"Research is... really the lifeblood of American medicine."

patient's death, rather than the fact that the muscle has been damaged beyond repair.

In fact, if somebody has a heart attack in the community, there is about a 60 percent chance they're going to die of that heart attack.

***Q.** Are these the so-called sudden death heart attacks?*

A. Sudden death: that's exactly what it is. Dr. Buckingham uses a whole variety of technologies to normalize abnormal rhythms. He uses a technique known as invasive electrophysiology in which you actually start the irregular rhythm in the cardiac cath lab, and then give a medicine in order to see if that medicine in fact works.

He also uses the implantable defibrillator. This is a device that detects an abnormal rhythm and gives a small electrical shock to the heart to convert the rhythm back to normal. This is a technology that works very well. Implanting the defibrillator is a relatively minor operation and the shock is of relatively low voltage. It doesn't produce any discomfort, and it saves patients' lives.

Arrhthymias can occur in infants and in all ages. They occur more commonly in people who have heart disease, who tend to be over the age of 45 or 50. But rhythm disturbances can occur in teens and electrophysiological technologies are revolutionizing our ability to treat them.

***Q.** What role is basic research going to play in your program?*

A. We definitely see a role for basic science. We will be collaborating with the basic scientists who are already in our institution, in physiology, biochemistry, immunology and pathology. In fact, we've met with all four groups, so that we plan a very active collaboration with those basic science departments.

In addition, the Heart Institute and the cardiology section need to study basic problems that have relevance to what happens in clinical medicine. And by that, I mean, in cardiomyopathy, for instance, the damage to the muscle probably occurs due to an inflammatory response that gets out of hand. So the question is why does the inflammatory response get out of control in the heart?

In order to understand that, one has to understand the white blood cells that circulate in the body. Using a catheter technique one can obtain a heart biopsy, a small piece of heart tissue, and one can look at these inflammatory cells and decide what they are, what type of medicine you might want to give in order to get rid of them and prevent cardiomyopathy from occurring, or if it's already there, make it a lot better.

***Q.** What about animal research? As I understand it, you're going to have some wet labs. What contribution does animal research offer for what you're doing?*

A. You can only learn so much from doing molecular research and cell biology research, and I've done a reasonable amount of it in my 20 years in medicine. Once you have a hypothesis that is supported by cellular and biochemical data, you can't then just move into a human. You really must move to an intermediate set of experiments where one evaluates an important question in a live animal. I'm well aware of the animal rights arguments, however one has to remember that the morbidity, the suffering and the early premature death that occurs from cardiovascular disease is enormous. The only way we're ever going to make a dent in this, and the only way we've done it in the past, is by working in animal models. Then if it works there, one transfers the knowledge from animals to humans. You're trying to do some good for human beings, and there's a price to be paid and this is one of them.

***Q.** If you had to articulate the three or four most significant questions we need answers to, to understand and fight heart disease, what would they be?*

A. I think in terms of atherosclerosis there'd be two questions. One question is, what is the nature of the injury to the vessel lining, the endothelium? And why does it allow scar and fat (plaque) basically to build up? We have some hints; we have some ideas. But really we don't know. And I think that in terms of atherosclerosis that will be one of the two big questions.

The second question is, once you get this build-up and narrowing, the narrowing itself then triggers a complete occlusion of the vessel. And we really don't understand why that happens.

Now we do have thrombolytic therapy that will dissolve the clot but if we could understand what the trigger is for it to occur in the first place, then we could prevent it and treat it more effectively. There is no question that thrombolytic (clot dissolving) therapy is a major breakthrough; but when you give TPA or streptokinase—both thrombolytic agents—you make all of the blood not clot. So if you have a cut on your leg, it will start bleeding again. If you have a hemorrhage into your eye, it will start bleeding again. So wouldn't it be nice if there was a medicine that you could give that would go to the coronary, dissolve that clot, and not affect the rest of the body? You'd get rid of 99 percent of the side effects. People are working on that. That is possible. It's just that we have to understand more about what makes that clot unique.

I would say there are two other areas in cardiovascular disease that are critical. One is, what causes cardiomyopathies? Cardiomyopathy is becoming more common—it affects young people, teenagers. It used to be dwarfed by our other cardiovascular problems, but it's really a relatively common problem. What is the damage that is caused to the heart muscle cell itself? We have to understand a lot more about the immune process, about the process that allows the inflammatory response to get out of hand and how to better keep it under control, so when we identify somebody in the early stages of cardiomyopathy, we could actually treat and stop that process. Now we hope it will stop by itself; we don't really have any way of treating it.

Then the final area I think we need to understand is why is it that the heart pumps so badly in all different forms of shock? Why does the heart get damaged and how does it get damaged? And the answer to this question lies in the fact that there are molecules that, when they attach to the heart, cause the heart not to pump. They are myocardial depressants. There are probably a lot of them and they probably influence all kinds of diseases that eventually lead to this shock-like syndrome or severe heart failure.

If we understood those depressant molecules, we probably would be able to save thousands of lives by making inhibitors to those particular molecules. This is an area of intense investigation but is something that really needs to be focused on much more clearly, and I think some of our breakthroughs will come in that field.

Q. *And these are areas that you and the people you're recruiting are all working in?*

A. Yes.

Q. *As a cardiologist, what would you tell the general asymptomatic population are the key things that they can do for themselves and their children, to try and prevent heart disease in themselves? What can we do to manage or lower our risks?*

A. The things that are clearly useful are never smoking, never taking it up and never having to quit. Knowing what your blood pressure is and making sure that if it's up, that you get it controlled. And eating a diet that is low in saturated fats, following it for a long period of time and trying to instill in your own family the fact that this is a very worthwhile thing to do.

Those are the three things on the atherosclerotic side. The fourth thing I think is worthwhile is to not be afraid of seeing physicians and going to them relatively early, especially if there's a history of any heart problem in your family. Cardiomyopathies are much better handled if they're seen early. There are new therapies and new thoughts being developed every day.

The Challenge of AIDS for patient, caregiver and researcher

By Carmeline Esposito

"I'm not giving up. I'm a fighter. I'm very hopeful."
(AIDS patient)

In this war, there are thousands of casualties. Many more thousands will become infected and struck down before we reach the year 2000.

The enemy in this war attacks the human immune system and renders it helpless to fight off infection. The enemy is AIDS—acquired immune deficiency syndrome. The causative agent is a new virus, a retrovirus, known as human immunodeficiency virus, or HIV. The war began in 1981 when the Centers for Disease Control (CDC) reported five unusual cases of a rare pneumonia among homosexual men in Los Angeles. Since that time, according to the CDC, there have been 117,781 reported cases of AIDS in the country, with 70,313 deaths. Sixty percent of these deaths occurred in homosexual or bisexual men.

"Because of the AIDS epidemic the whole complexion of infectious disease is forever changed," says Harold A. Kessler, M.D., Director of the HIV Treatment Program at Rush-Presbyterian-St. Luke's Medical Center, and associate professor of medicine and immunology/microbiology.

"Before AIDS we never had large numbers of outpatients we followed for chronic illness. For example, a patient with tuberculosis would be followed up several times after hospitalization and then we would refer the patient back to his primary physician to complete treatment. AIDS patients, however, tend to have many serious recurring infections which, because there is no cure for the disease, ultimately cause death. It is because of these infections that we have become the new primary care providers for AIDS patients," Dr. Kessler explains.

HIV infection is spread in three ways: sexual contact with an infected person, through contaminated blood such as sharing needles with infected persons on intravenous drugs, (heroin or cocaine), and from an infected mother to her baby. HIV is *not* spread through casual contact, such as shaking hands, using utensils or toilets, sinks or bathtubs that an infected person has touched, food handled by an infected person, or through sneezing, spitting or coughing by an infected person. Nor can one get AIDS by donating blood. All needles, syringes, containers used by blood centers are sterile. Once used, they are discarded.

A person infected with HIV may not look or feel sick. There are, however, some common symptoms which may appear. These include fever, "night sweats," fatigue, swollen glands, unexplained weight loss and diarrhea. When any of these symptoms persist, the sufferer should see a physician. A blood test can detect if antibodies to the virus are present.

Infected persons are prone to a variety of infections, known as "opportunistic." These include a form of pneumonia (pneumocystis carinii pneumonia), meningitis (caused by a fungus) and cytomegalovirus retinitis. As time goes by, the immune system continues to be compromised with recurring opportunistic infections, usually resulting in the patient's death within seven to eight years. However, persons can be infected for up to ten years or longer before they begin to develop these types of opportunistic infections.

> *"Because of the AIDS epidemic the whole complexion of infectious disease is forever changed."*
>
> **Harold A. Kessler, M.D.**

The majority of AIDS patients currently are homosexual and bisexual white males but the number of cases in heterosexuals is steadily increasing. Because of sexual preference and lifestyle, AIDS patients require a more comprehensive response from health care practitioners. Some patients are coping with insensitivity and even hostility from families and friends. Their employers may not understand the illness and its consequences, so problems with work attendance and health insurance eligibility and duration are not unusual. Basic issues, such as where to live, and who will be helping with medications and trips to the doctor or community agencies have to be resolved.

The Beginning

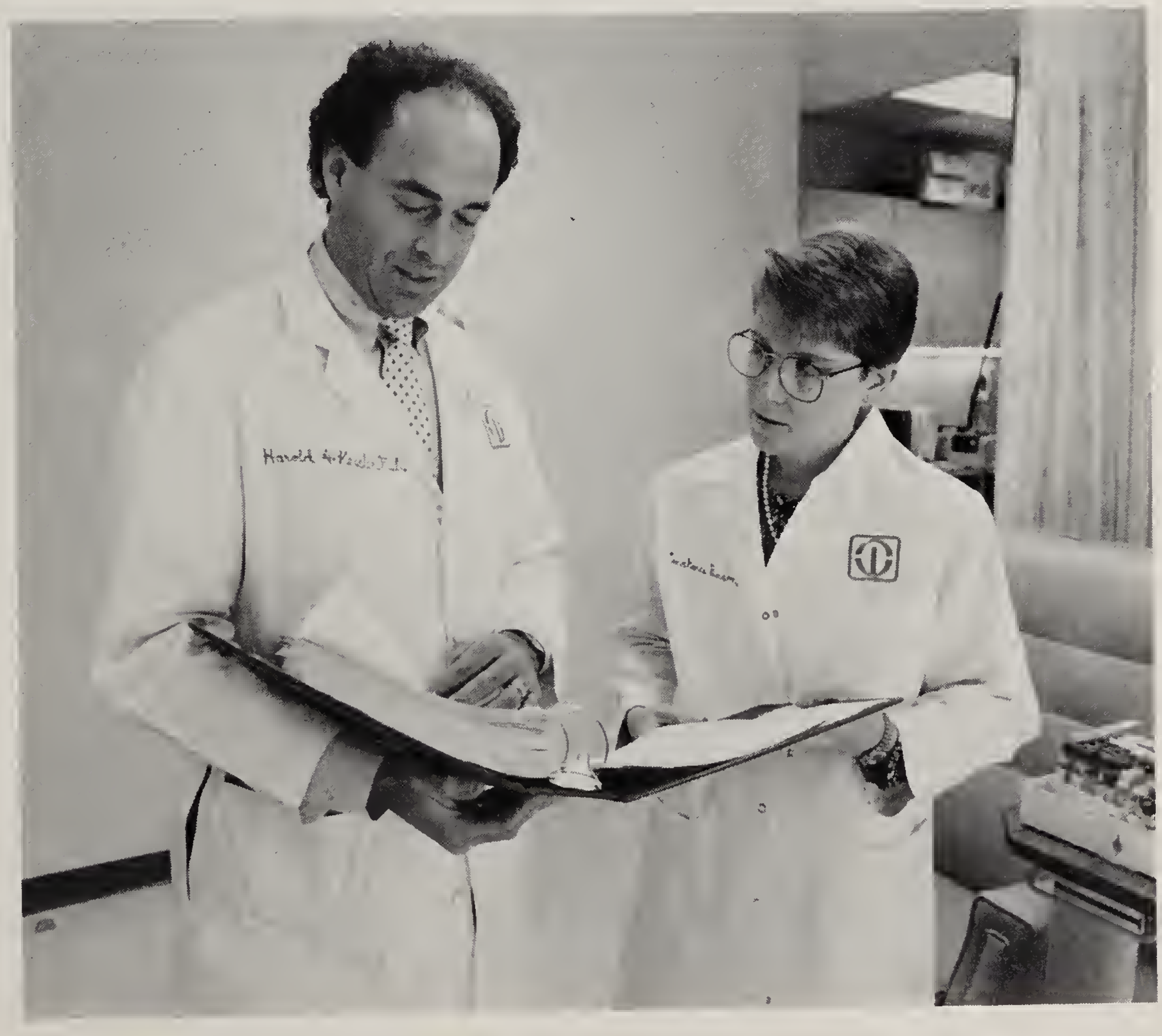
The first AIDS patient admitted to Presbyterian-St. Luke's Hospital was referred to infectious disease physicians in August 1982. This patient, a 28-year-old, bisexual male, came into the hospital suffering from esophagitis. In addition his immune system had been invaded by pneumocystis pneumonia, an opportunistic infection caused by pneumocystis carinii, a protozoan-like organism which has become very common in persons with AIDS, or PWAs as they have come to be called.

This early PWA was in and out of the hospital with various infections until he died in 1983. At that time, there was no zidovudine (AZT, an anti-viral drug now the only FDA-approved drug for slowing the progression of AIDS) and infectious disease physicians were just beginning to learn about HIV and its accompanying group of rare and difficult to treat infections. HIV was not discovered until 1983 and was not established to be the cause of AIDS until 1984.

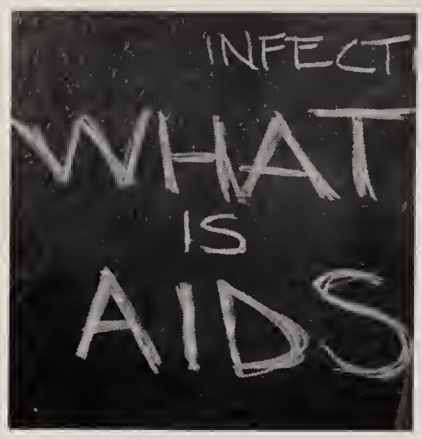
"We learned a lot from early AIDS patients," says Mary Ann Colletti, M.S., R.N., AIDS clinical nurse specialist, medical nursing. "Because of the range of medical and psychosocial problems and personal concerns these patients had, our caring for them depended heavily upon a sharing of our expertise. The need for participation by staff from other disciplines became apparent when one of our patients required admission to the psychiatry unit."

Colletti and two colleagues, Nancy Kowal-Ellis, R.N., psychiatric nursing, and Gail Mallory, R.N., medical-psychiatric nurse liaison, convened an AIDS Interest Group and invited representatives from various departments, including internal medicine, religion and health, and the Office of Consolidated Laboratory Services (OCLS), to discuss how to coordinate care of these early AIDS patients. Colletti and fellow professionals realized that these young, immune-suppressed men were suffering not only from a strange new illness but also from the fallout of its social, psychological and spiritual effects. By 1986, as more information became available, an AIDS care team was formally established.

The founding team, in addition to Colletti, were James Corrigan,



Harold A. Kessler, M.D., and Constance A. Benson, M.D., discuss a patient's file in the Infectious Disease Outpatient Clinic.



O.S.A., associate professor, religion and health, and director of pastoral services; discharge planner Dorothy Nachel, R.N., community health nursing; and MaryAnn Winters, M.S.W., social services.

These professionals were soon joined by others—physicians and nurses from infectious disease and Rush Home Health, and experts from psychology, psychiatry and social services. As a focused team, they were able to assist patients with both their medical and practical needs: home health care, supportive counseling, referrals to community resources, and pastoral care. The team members also helped each other. "We grew to depend on each other a lot, not only for medical expertise, but also for support," says Colletti.

The AIDS Care Team has now evolved into the AIDS Consultation Service. Each of the service's 10 members offers expertise encompassing a variety of clinically relevant issues and a high degree of caring. Colletti, along with AIDS clinical nurse specialist, Joyce Fitzpatrick, M.S., R.N., medical nursing, coordinate the service. Patients, partners, family members and friends, primary care physicians, nurses—anyone who knows or cares for PWAs—can contact the service for help in learning about the disease, for supportive counseling, financial intervention, discharge planning from the hospital, home care, and for long-term care placement.

Three founding members of AIDS Care Team: Rev. James Corrigan, O.S.A., MaryAnn Winters, M.S.W., and Dorothy Nachel, R.N.

Responding to the AIDS Patient

In the years since the first AIDS patient was admitted to Presbyterian-St. Luke's, much has changed. "We're seeing a much more diverse population of patients now than in earlier years," says Joyce Fitzpatrick. "We're seeing more Blacks and Hispanics and women. These women are partners or wives of IV drug users, or use IV drugs themselves or have gotten the disease through heterosexual contacts." The hospital's response to this changing patient population is also broadening. An "AIDS cluster" of beds, opened in 1989, now offers patients an option to placement on a regular medical unit.

"Some patients don't want to be associated with a specific AIDS area and prefer to be on a regular service. Others feel the need for a community-like setting which provides the opportunity to meet with other PWAs and to feel comfortable about discussing their illness with the nurses," says Fitzpatrick. However, all PWAs, wherever they select to be treated, are visited by a consultation service coordinator and encouraged —if they are physically able and behaviorally competent—to participate in the AIDS support group led by William Gilmer, M.D., a psychiatry resident, and Alice Geiss, M.S., R.N., a psychiatric nurse. In this group, patients exchange information about HIV, AIDS and new experimental treatment protocols and discuss their feelings of anxiety, stress, depression—and about death. "It's important for these patients to retain a

"You can be careful and compassionate at the same time... We let our patients know we are not afraid of them."

Joyce Fitzpatrick, M.S., R.N.

sense of who they are," Dr. Gilmer says.

Because of the range of problems and complications affecting AIDS patients—high temperatures, nausea, wasting syndrome, dementia and blindness—nurses who care for them are continually challenged. In the cluster, all nurses are volunteers. "Many are younger nurses," says cluster project director and assistant unit leader Diana Mixon, M.S., R.N. "Many are just beginning their careers. We find that they are eager to learn and grow as nurses in this very specialized setting."

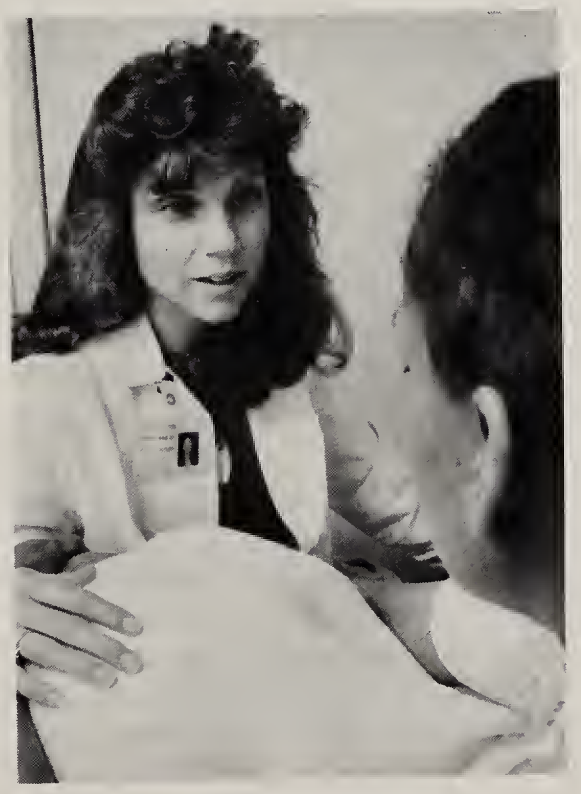
Special support services are also in place. Usually within 24 hours of admission, each patient is visited by an ACS member, who does a complete psycho-social assessment. "I ask patients what community resources they may be involved with and how much they know about HIV infection and AIDS. I emphasize we have available lots of information and resources and that we are here to help them, their family members and friends to learn to live with AIDS."

In working with AIDS patients, nurses on the cluster and throughout the hospital follow the hospital guidelines for safety. When handling bodily secretions and blood from all patients, they wear rubber gloves. "But you can be careful and compassionate at the same time," says Fitzpatrick. Both Mixon and Fitzpatrick believe strongly in nursing's emphasis on the therapeutic value of touch. "We let our patients know we are not afraid of them," they say. "We make a point to touch our patients. We give them back rubs. We shake their hands...we hold their hands."

Caring for the Spirit

PWAs are living with and fighting a disease which probably will, at some point, end their lives. Some patients consider suicide either soon after their diagnosis, usually within the first six months to a year, or much later in the course of the disease when more dramatic neurological deterioration begins. This latter group may have profound depression, dementia and even episodes of delirium.

Caring for the spirit is a major concern of James Corrigan. Since the early days of the AIDS Care Team, Reverend Corrigan has been developing a residency program for pastoral care students which combines a year of clinical pastoral education with a specialization in AIDS. It is the first and only program of its kind in the country. In addition, Corrigan is the president and co-founder of the AIDS Pastoral Care Network in Chicago. One hundred and fifty pastoral care providers of various denominations serve as volunteers in the network, which has become a resource and a model for other cities.



Joyce Fitzpatrick, M.S., R.N., medical nursing, talks with an AIDS patient.

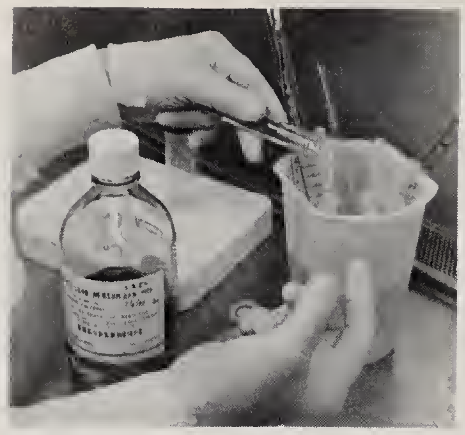
Working alongside Corrigan, are two resident chaplains who care for inpatients and outpatients and provide supportive counseling.

"Many AIDS patients among the white gay men population have experienced a lot of rejection and judgment from the Judeo-Christian religions. But, I find that they do have a very deep personal concept of God and spirituality." He adds that PWAs who do rely on a traditional religious institution often have fears that others will find out about their disease and cast them out of church.

Corrigan and the other pastors' approach is to support the patient's development of spirituality as a resource for both living with and dying of AIDS. When death comes, the pastors write to parents, partners and other family members, offering sympathy and including information on resources to contact for support.

Two "veterans" of the AIDS war in and out of the hospital, are nurse discharge planner Dorothy Nachel and social worker MaryAnn Winters. They wear a variety of hats: advocate, teacher, consultant, counselor, trouble shooter. Says Winters, "For me, working with HIV patients and AIDS patients is the biggest challenge of my career. The emotional toll is high because we sometimes get so involved with PWAs and their families."

There are also frustrations. "With AIDS patients living longer because of AZT and other drug therapies, there is a dire need for skilled nursing home care when the



patient is dependent for his daily needs and no longer ambulatory," Nachel explains. For example, she describes the case of Victor* who has been in the hospital now for two months. "He came in with wasting syndrome, looking very emaciated. Now his mental status is deteriorating. He needs 24-hour skilled care and there aren't many places I can refer him to." Winters agrees. At present, there is only one facility in the Chicago area which provides nursing home care —Oak Forest Hospital. A few other traditional nursing homes are in the process of applying for licensure to care for these patients, but Nachel and Winters say the process is slow and frustrating.

Both Nachel and Winters spend much time on the phone trying to locate resources in their continuing struggle to find appropriate housing, home health care, and other vital social services for patients when they leave the hospital. It is not an easy task. One PWA Nachel is helping is Don.* Don has a history of respiratory problems; and was recently admitted for toxoplasmosis. Don also abuses alcohol. "He's disoriented, and has neurological deficit. He has been living alone and his family is out-of-state. Some of his family know he has AIDS, but I don't think anyone is able to care for him. Who will take care of him?," she asks.

Arranging care is sometimes complicated by the fact the patient has kept the diagnosis to himself. In initial meetings with PWAs in the hospital, Winters almost always asks who knows about the illness and "who don't you want to know about it." Learning these answers is critical, Winters explains, to helping the patient maintain his/her privacy.

For those who are able to return home, there is the Rush Home Health Service. Last year home health nurses cared for about 150 AIDS patients in their homes. So far this year, the caseload averages between 25-30 patients per month.

"Patients stay in our service longer because of all the care they require and because of the research protocols going on," says Lydia Tanner, R.N. "Many receive IV therapy. We visit these patients often and provide the physician with regular status reports. We see a range of patients, from those who are living alone and managing their care well to those who need live-in or homemaking help, or have to go to the hospital or Oak Forest," says Tanner.

At least once a month, every patient is reviewed. "In the beginning, we found we were very technical, taking care of IVs and things like that. Now, after a year, we've changed direction. The nurses have grown in knowledge and how they assess the patients." With AIDS patients, Tanner acknowledges that the approach is different. Although AIDS is a terminal illness, there's always some new therapy to try. "These patients, in contrast to terminal cancer patients who know when all has been done that can be done for their disease, are continually offered hope. That's good and bad at the same time. It makes it harder to cope with recurring infections, and ultimately, it makes it harder to die at home."

The Next Wave: Infants and Adolescents

On another front in this war are infants and adolescents. Because the virus is spreading into the heterosexual population, many of whom are IV drug users, physician/immunologists at Rush believe that by the mid-1990s they will see more infants and adolescents with infections and AIDS.

According to Kenneth Boyer, M.D., director, Section of Infectious Disease/Pediatrics, and associate professor of pediatrics and immunology/microbiology, about 50 percent of the infants born to women who are infected with the virus will have infection. Although all of these babies will show antibodies against the virus in their blood at birth, he says "we don't know in a newborn whether their antibodies are a reflection of true infection or are simply antibodies from the mother that have crossed the placenta. Further, we don't have a good understanding of exactly what determines which of the babies will become infected and when during pregnancy their infection actually occurs—at three months gestation, at seven months gestation, or at delivery? These important questions are under investigation. Answers may permit prevention of infection in babies."

When an infant tests positive for HIV, Dr. Boyer says that no one knows at this time what the best medical management should be. "We watch these babies closely. We immunize them, provide 'well baby' advice and treat minor illnesses in much the same way we would for other children." Development of anti-HIV treatment regimens for infected babies lags far behind pharmaceutical research in adults. "Partly this is because the incidence of pediatric AIDS is only now starting to escalate, but it's also because the financial incentive for pharmaceutical companies is primarily to develop treatments for adults."

In some places, AZT is being administered orally and intervenously to young children on experi-

"In New York City, half of all pediatric hospital beds are occupied by children with AIDS."

Kenneth Boyer, M.D.

(From left) AIDS researchers Greg Spear, Ph.D., and Matthew Bankowski, Ph.D., in the retrovirology laboratory.

mental protocols. However, he says that this is very intensive and expensive treatment for children who may not yet show any consequences of the virus. For the more severely affected children, changes in life expectancy with treatment have yet to be demonstrated.

Dr. Boyer says that the life expectancy of HIV-infected babies is only now beginning to become clear, through prospective studies. Depending on complications, some live only a month or two, others nine years or longer. He believes that early diagnosis and treatment of pediatric AIDS is important, but prevention is infinitely more so.

Other problems also affect these babies. "Because many of their mothers are not capable of taking care of them," Dr. Boyer says, "many are in foster care. They have legal difficulties. The foster parents, who are hard to find in the first place, often keep the fact of the child's illness to themselves. They feel neighbors, their other children's playmates and parents, may not understand and fear contracting the disease." He adds that there is a tremendous need for compassionate long-term care for these young children. "In Chicago, we haven't had to come to grips with this yet. But in New York City, half of all pediatric hospital beds are occupied by children with AIDS! They have no parents, and they can't be placed."

"AIDS infection among teenagers is going to be the next crisis," says Gary R. Strokosch, M.D., director, Section of Adolescent Medicine, and associate professor of pediatrics.

"The adolescent patient is different than the adult patient," says Dr. Strokosch. "For one thing, they are nowhere near as knowledgeable about AIDS as adult male homosexuals. Nor are they inclined to unite and become activists for more research and care." Dr. Strokosch points to the issues of consent and confidentiality which always need to be considered when physician and patient are coping with a sexually transmitted disease. Can an infected teenager make good decisions about care—the future? Does the teen have to tell anyone? Will he/she see a physician regularly? Is a teen capable of coping with HIV and AIDS as a terminal illness? Dr. Strokosch has serious doubts about the answers to all these questions.

He adds that teenagers do not think about death and dying. Further, Dr. Strokosch points out, there are many nurses and physicians who do not understand teenage sexuality and therefore do not know the right questions to ask teens about their sexual practices, or if they practice "safe sex," or even know what illnesses they can contract from unprotected sex.

Dr. Strokosch says those teens most at risk to get HIV infection are girls who have contact with young adult male IV drug users or bisexuals. Also at risk are teenage IV drug users and teenage male homosexuals or bisexuals. Of course once the AIDS virus becomes prevalent in the adolescent population, all teens who have unprotected intercourse will be at risk for infection. Although the number of reported AIDS cases in adolescents is currently low—one percent of all cases—it is doubling each year.

He and other physicians and

"AIDS infection among teenagers is going to be the next crisis."

Gary R. Strokosh, M.D.

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health care deliverers in Chicago and the Midwest are preparing for battle against HIV and AIDS among adolescents.

"There is an AIDS Consortium already formed and meeting. This group includes physicians, youth-serving agency professionals, researchers, community leaders and others concerned about adolescents and AIDS. We meet monthly to talk to each other, exchange information about cases and experiences, hold regional conferences to increase public awareness and are building a network to deal with and, it is hoped, prevent a devastating epidemic among adolescents in our area."

Fighting AIDS in the Laboratory

In 1988 the infectious disease section at Rush became a part of the National Institutes of Health AIDS Clinical Trial Group (ACTG) which evaluates potential new therapies for patients with HIV infection and the infections and neoplastic complications of AIDS. Dr. Kessler, who directs the ACTG studies at Rush, works in conjunction with Northwestern University. At present, there are over 40 studies ongoing through the ACTG system. Rush researchers can opt to conduct any ACTG protocol in the system if the right patient population is available for the study and a researcher has an interest in the study's objective. For the last year or so, at various points in time, Rush has had 15-20 AIDS treatment ACTG protocols underway for both inpatients and outpatients.

"Basically, we have drug trials in three areas," says Dr. Kessler. "These include new drugs which are anti-viral, those used as prophylaxis against opportunistic infections, and those which will help us to better understand the treatments available for opportunistic infections." He emphasizes that AZT is the only FDA-approved drug thus far to have delayed the progression of AIDS.

"We have about 100 patients in the AZT study in which we are looking at its safety and efficacy for asymptomatic HIV-infected persons," says Pamela Urbanski, M.S., R.N., a former surgical nurse who saw AIDS research as an opportunity to broaden her knowledge and deepen her nursing skills. In addition, there are AIDS and ARC patients with previous bone marrow toxicity (anemia) from AZT on a combination therapy of AZT and ddC—dideoxycytidine—and three new studies of ddI—dideoxyinosine—testing its efficacy as compared to AZT.

Dr. Kessler has written a protocol for a new treatment of one of the more common opportunistic infections—cytomegalovirus (CMV) retinitis. This infection can cause blindness in AIDS patients. Many AIDS patients taking AZT face a difficult decision when CMV occurs. "The PWAs in the study were taking ganciclovir for active CMV retinitis," Dr. Kessler explains. "However, studies have shown that using ganciclovir and AZT at the same time can increase bone marrow toxicity. With this new therapy we can suppress chronic CMV by high-dose intravenous acyclovir. A study at the National Cancer Institute has shown that AZT and acyclovir given concommitantly did not cause any increased toxicity." This protocol is one of the ACTGs now underway at Rush.

Another new drug which has received attention from the press and PWAs is SC-48334 (N-butyldeoxynojiramicin). "We began this phase 1 study in the summer of 1989," notes Urbanski. "The study, which will determine tolerance for the drug in patients with AIDS and advanced ARC, is the first on humans. And, we have the most patients enrolled." The drug has a high priority rating from National Institutes of Health (NIH). SC-48334 appears to inhibit the formation of important molecules (sugar molecules attached to protein) on the surface of HIV. Blocking the formation of the glyoproteins on the virus's surface seems in some way to inhibit the infectious process. Although the medication does not kill the virus, some scientists hope that it may slow it down or stop its spread.

Nursing Award Targets AIDS Research

Nursing is also focusing on AIDS research. The College of Nursing at Rush University received a $515,000 training grant from the National Center for Nursing Research of the NIH. The five-year award is the first institutional National Research Service Award given by NIH to prepare nurse scientists in AIDS research. Janice M. Zeller, Ph.D., R.N., is program director of the grant. Three predoctoral and one postdoctoral fellows are currently in training.

"Our goal is to recruit postdoctoral candidates with strength outside of AIDS nursing and provide a new dimension to their expertise," Dr. Zeller says. "The current postdoctoral fellow, a nurse with doctoral training in stress physiology, is evaluating the role stress plays in the progression of HIV infection."

Along with Dr. Zeller this researcher is studying the effect of stress hormones, known as glucocorticoids, on the ability of the virus

"We need to know as much as we can about these new (and old) invaders of the human immune system."

Alan L. Landay, Ph.D.

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to infect and replicate in immune cells. Another in the program proposes to evaluate whether stress reducing mechanisms, such as massage, biofeedback and meditation, alter the outcome of HIV infection.

Another fellow is also interested in how HIV infection affects the brain and the patient's ability to remember. In addition to doing neuro-psychological testing of infected individuals, she is attempting to correlate these changes with immune system changes by examining serum and plasma for the presence of "tumor necrosis factor." This factor is the product of monocytes—a mononuclear cell in the blood—which is infected by the AIDS virus. It has been postulated that dementia occurs as the result of monocytes carrying HIV to the brain.

Other investigators have shown that when put into culture with brain tissue, the tumor necrosis factor is toxic to brain tissue. "Our study was designed to see if there is a relationship between the blood levels of the tumor necrosis factor and the onset of dementia in HIV-infected persons," Dr. Zeller says.

Knowing the Enemy

For Alan L. Landay, Ph.D., knowing the enemy (HIV and AIDS) is basic to defeating it. Landay is associate professor, immunology/microbiology, pathology and internal medicine and director of the clinical immunology laboratory and flow cytometry facility of the Office of Consolidated Laboratory Services. He is currently on a year's sabbatical to receive further training in retrovirology at the University of California at San Francisco.

"This year is being spent learning some basic techniques: how to culture HIV, assay for it, look for its toxic effects, and recognize its hallmark features, or footprints of the virus, when it infects the cell." He reports that he is expanding his knowledge of molecular biology techniques as they apply to retrovirology by learning how to measure the virus at its protein, DNA level and RNA levels.

"We're using flow cytometry, which is a computerized analysis of cell parts, as a new technology to address questions in retrovirology," adds Dr. Landay.

Scientists in the war against AIDS are puzzled about how the virus attacks certain lymphocytes (white blood cells, specifically called T-cells) and goes on to replicate itself and wreak havoc on the immune system. Dr. Landay is currently looking at one of these lymphocytes—the CD8—and asking how this cell controls HIV replication. He's also examining what role AZT plays in affecting the CD8 function, by studying pre- and post-AZT patients and seeing what happens to the CD8 anti-viral function when exposed to the virus.

Dr. Landay adds that an ultimate goal of the basic science research for AIDS is to establish a retroviral diagnostics laboratory at Rush under the Office of Consolidated Laboratory Services.

Dr. Landay describes himself as a "hybrid" individual. "I'm melding virology and immunology in order to better understand the immune system—not only in what's happening with AIDS but other illnesses

Nuannoi Rattan, Ph.D., R.N., (left) prepares cells for cytometric analysis as part of her AIDS research. Observing are fellow researchers Barbara Swanson, M.S.N., (center) and Janice M. Zeller, Ph.D., R.N.

as well. We need to know as much as we can about these new (and old) invaders of the human immune system."

Matthew Bankowski, Ph.D., SM, (ASCP), acting director of retrovirology, and instructor, immunology/microbiology, directs the laboratory aspects of the clinical research studies underway at Rush. Among the numerous projects in the retrovirology laboratory is the ongoing two-year, double-blind study of acyclovir with AZT. This protocol involves monitoring the patient for antibodies to the virus and also for the virus itself in culture. "We want to see if the addition of acyclovir to AZT enhances AZT's slowing effect on the virus," Dr. Bankowski explains. In addition, he is studying novel ways to detect low numbers of virus and monitor therapy using extremely sensitive techniques.

Culturing for the virus is sensitive, painstaking work. As a member of the ACTG system, the Rush retrovirology lab is one of only a handful of labs in the country approved to culture virus. By actually growing the virus in the lab, scientists can study its activity at every stage and monitor patients through the virus culture. Eventually, by culturing the virus and learning more about changes in its genetic material, Dr. Bankowski believes that scientists will come up with a combination of therapies to suppress the virus and allow patients to have a "normal life."

Greg Spear, Ph.D., assistant professor, immunology/microbiology, is involved in AIDS basic research. Dr. Spear and his lab colleagues are studying the interaction of HIV and complement (an important component of the immune system) to learn how the virus goes about infecting and destroying cells.

The second aspect of Dr. Spear's research involves the study of the action of monocytes (large mononuclear white blood cells with more protoplasm than lymphocytes) in the blood. The question is how do the monocytes become altered, allowing the virus to infect them? When the answer is known, scientists and clinicians may be better able to predict who is at risk for AIDS and who will subsequently develop the disease.

The third aspect of study for Dr. Spear involves interferons, proteins produced by the body. Interferons work to protect the body from infection. Although interferons are being produced in the presence of the virus, it is not clear why they are not having an anti-viral effect. "We are looking for ways to use interferons more effectively against AIDS," adds Dr. Spear.

Winning the War

Much has been learned about HIV and AIDS in the eight years since the first patient was seen at Rush. Although Dr. Kessler estimates that by 1994 there will have been 15,000 to 20,000 cases of AIDS diagnosed in Illinois, the consensus of the professionals who battle it each day is that perhaps in 10 years—a relatively short period of time in research terms—a combination drug therapy will be discovered against AIDS. Until then, Dr. Kessler stresses "Primary physicians have to learn about this infection and how to recognize it so they can begin their patients on drug therapies, such as AZT, sooner and patients' lives can be extended. In the 1990s, the family physician will become the frontline in the war against HIV infection and AIDS." ♁

Students' AIDS Program Reaches Inner City Teens

"I'm going to kill whoever it was who gave it to me," says an angry adolescent who just found out he has AIDS. A friend asks, "But how do you know who gave it to you?" His troubled look answers for him—he doesn't know.

This young man doesn't actually have AIDS. But as he participates in role-playing projects presented by a group of Rush University medical students, he is learning how to be more sensitive to those who do.

The Rush Medical College students, members of Rush AIDS (RAIDS), have a special relationship with the inner-city adolescents in the young man's school. They are both, in different ways, learning about sexually transmitted diseases (STDs) and the disease AIDS. Rush students are learning how to teach awareness, sensitivity and prevention of these diseases in a way that adolescents can understand.

The program arose from student interest. "When we were discussing STDs in class, we identified the need for education among the adolescent population," says Peter DeGolia, now a fourth-year medical student at Rush Medical College.

When DeGolia and classmate Greg Thompson were second-year medical students they approached Edward Eckenfels, assistant dean, academic counseling, and associate professor, preventive medicine, about starting a program for teaching adolescents about STDs and related complexes.

"AIDS has already infiltrated into the inner-city community," says Eckenfels. "Adolescents in this population needed to be told that they didn't have to use IV drugs or be gay to contract AIDS, but we didn't want to reinforce fears and cause hatred or hysteria in the community."

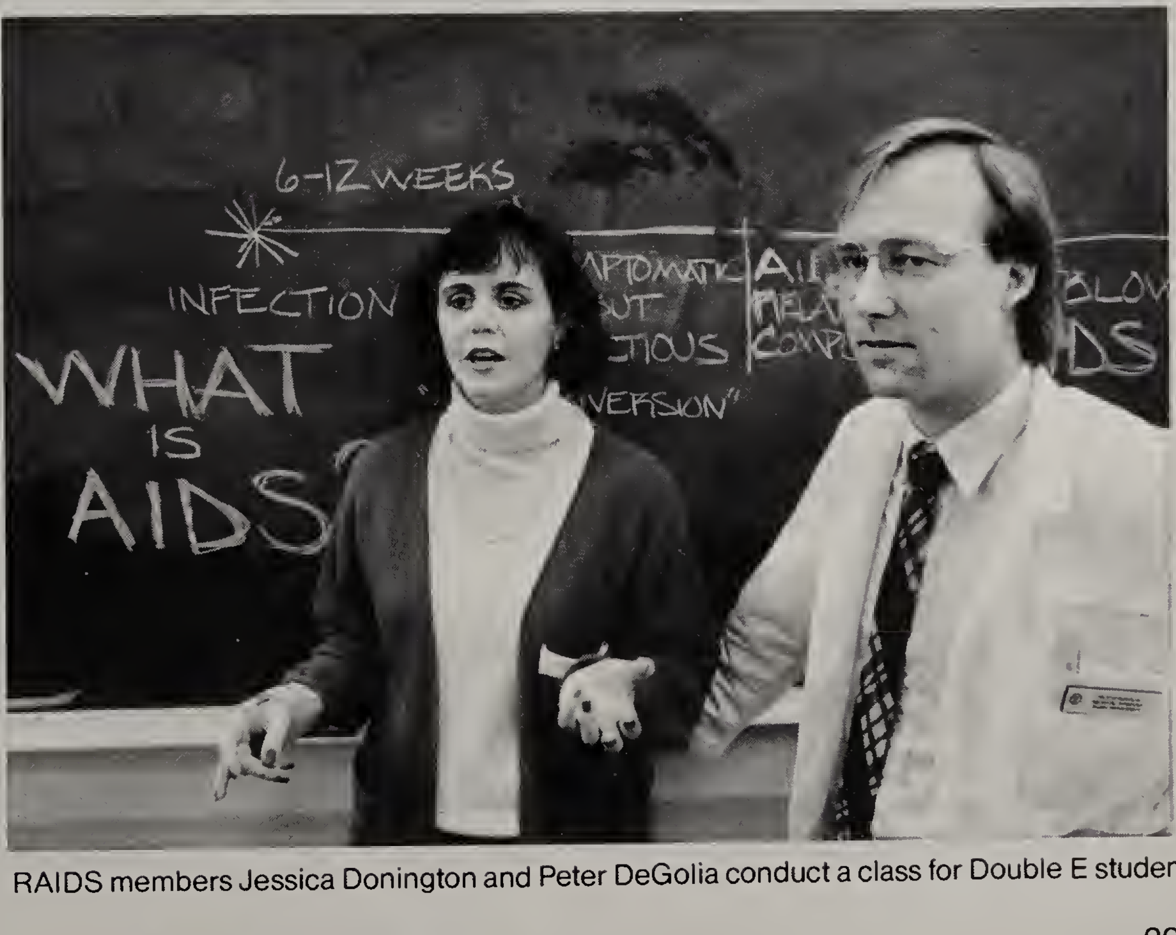
DeGolia and Thompson organized a group of their classmates interested in teaching the facts about pregnancy and STDs to adolescents. That group became RAIDS, and their audience was waiting for them.

Through an "Adopt-A-School" Program with the Chicago Public Schools, the preventive medicine department began participation in the Urban Youth (Double E) Program in 1980.

The Double E (education and employment) high school program was created by the Chicago Public Schools and the Board of Education to help high school dropouts age 16-18 return to school, graduate, and prepare for the world of work. "It provided the perfect opportunity for Rush students to reach out to this age group," says Eckenfels. The program's location is in Chicago's Loop, so the Double E students can see how different careers contribute to a progressive and successful society.

But before entering the world of work, these students also needed to understand the world of life. They needed to understand the reason that interrupted their education in the first place—pregnancy—and some of the myths surrounding it.

"Many adolescents hear 'street myths' about pregnancy, like if you're standing during intercourse, you won't get pregnant," says Katherine Harris, a teacher and job coordinator of the Double E program. "They also have misconceptions about diseases like gonorrhea and AIDS. The medical students help



RAIDS members Jessica Donington and Peter DeGolia conduct a class for Double E students.

replace these misconceptions with the truth."

To better understand AIDS themselves and to prepare to teach it on a level adolescents could understand, DeGolia, Thompson and a first-year medical student Jennifer England, with Eckenfels, designed special training sessions—unofficially entitled "AIDS 101"—for the student volunteers.

The three-session program featured a representative from the Rush Adolescent Family Center speaking about how to present sensitive topics to adolescents; infectious disease fellows explaining how HIV is transmitted, the symptoms, and other important information about STDs that adolescents should know, and psychiatrists discussing the psychosocial aspects of AIDS.

Students who completed all three sessions attended a fourth session, focusing on questions that adolescents might ask, and how to answer them. "We would not permit students to talk about AIDS at Double E unless they attended these sessions," says DeGolia.

"About 50 first and second year medical students, most of whom got involved this year, now participate in the program," says Jessica Donington, a second-year medical student who is now one of the program's leaders. "The ones who have presented often at Double E lead the entire group session; then there are small group leaders, and some students who mainly observe the group leaders and ask questions."

Donington says the class of 150 Double E students is broken down into five groups, each led by two or three Rush students who conduct sessions for 45 minutes to an hour. Double E students can interrupt any time with questions. Donington and her classmates try to keep the sessions light to hold the students' attention. This sometimes presents a challenge.

"My biggest worry is not that I won't know my material," says Donington, "it's that I won't be able to relate to the students." So far, however, that hasn't been a problem. "I've said some things to them that I've never said in front of anybody!"

A lot of giggling goes on as Double E students laugh off their discomfort with some of the topics that are discussed. According to DeGolia, however, "Double E students do ask some pretty sophisticated questions."

Of course, the *way* they ask the questions really puts the RAIDS group's interpretive skills to work. Although part of the learning process at Rush involves studying a whole new medical language, students in RAIDS must temporarily forget that language to learn a new one more common to the inner city. For example, when asked about the most unusual question a Double E student has ever asked, DeGolia can't help but grin as he gives the reply: "What bust when you bootie bust?" In other words, when one has anal intercourse, what breaks in order to put that person at risk for catching AIDS?

"The answer is that small blood vessels break and allow the semen that is transmitted to infect sexual partners, and thereby expose them to the HIV virus," he continues.

Although DeGolia makes it sound easy, there are times when a Double E student will ask a question the group leader can't answer. In that case, he or she is honest. "I tell them we'll get back to them on that," says Donington.

"Being at Double E helps us find the meaning behind all the learning we do," she continues. "You learn it has a purpose. And when the students see you as a doctor, you realize you're not so far from achieving that goal."

At first, Rush students passed out surveys to determine the demographics of their audience. They were asked their age, if they were sexually active, at what age they became sexually active, etc. "We were surprised to find how many teenagers already had one or two children and were still having unprotected sex," says Donington.

"Teens have this invincible thing," says third-year medical student Jennifer England. "I tell them 'don't wait for someone close to you to die before you believe us.'"

The American Medical Students Association (AMSA) recognized RAIDS as one of the first AIDS education groups organized in Illinois. For that reason, AMSA invited the group to speak to its national program called Students Teaching AIDS to Students (STATS).*

As for the future of RAIDS, Eckenfels says, "I hope the structure of the program will continue so that when one class graduates, the next class can take over. The thrust of the program came from the students. They got the people they needed to help them, and it became a marvelous co-partnership between faculty and students." J.R.

**RAIDS recently adapted its name to include the national organization from which it receives some funding. It is now officially referred to as RAIDS/STATS.*

> *"If students learn basic science information in the clinical context, they'll retain it."*
>
> **Harold Paul, M.D., M.P.H.**

Medical Education in the 90s

There are choices

By Barbara Harfmann

So, why do you think this 11-year-old diabetic is passing out repeatedly? A first-year medical student responds, "Maybe he's not getting enough insulin or is eating the wrong kind of food." Another student chimes in, "Well, Frank, that's possible but we don't know yet whether the diabetes is related to his present medical condition."

Questions and comments fly across the room as students try to address the problems in the patient's history. Under the watchful gaze of the clinical facilitator, the small group of six students question the metabolism of the boy's insulin, how the brain handles sugar and how the body burns sugar. One question begets another question throughout the lively three-hour, problem-solving session. Then it's off to the library to research the answers.

This type of interactive student exchange occurs regularly in Rush Medical College's two-year Alternative Curriculum (AC) program which focuses on small group learning and independent study.

Harold Paul, M.D., M.P.H., project director for the AC program and associate dean for educational development, Office of Medical Student Programs, says, "The case study method is a powerful way to define in very relevant terms what students need to learn in order to solve the problem under inquiry. I believe that when students learn facts from a lecture in order to pass an exam, they soon forget them and are forced to relearn the material again during their clinical clerkships. If students learn basic science information in the clinical context, they'll retain it."

Students in the traditional basic science curriculum attend large lectures and take numerous notes on a multitude of facts. The AC program's structure is vastly different. Small groups of six AC students attend two three-hour problem-solving sessions per week. The sessions are moderated by a clinical facilitator, most often a Rush faculty member experienced in the practice of medicine. Essentially a silent observer and skilled enabler, the facilitator may guide the discussion but never tells the group if their ideas are correct or incorrect.

Over the course of two years, more than 50 patient care cases, which are fictionalized but based on fact, are discussed in great detail. For example, when a lung cancer case is presented, the pathology, abnormal physiology and pharmacology of drugs used to treat the disease are all integrated into the case during the *same* week—not studied as isolated cases. Students attend laboratory sessions and spend many hours in the library researching pertinent information. This week of problem solving is followed by a resource session where an authority in basic and/or clinical science is available to help students "fill in the blanks."

In order to facilitate mastery of the material, and to keep AC students on the right track, faculty-prepared guidebooks are provided to each student. Material in the guidebooks includes topics to be covered in the unit, learning objectives for each topic and learning exercises available (e.g. computer-based simulations). The guidebooks also include self-assessment examinations and a bibliography with text and literature references.

The AC program focuses on three interrelated areas throughout the innovative two-year preclinical program: scientific content, problem solving, and introduction to the patient.

As Dr. Paul explains, "The AC program assists students in acquiring a knowledge of the basic sciences

through emphasis on problem-solving techniques that relate scientific study to typical clinical situations. Learning is enhanced by the opportunity to develop individual clinical skills, such as history taking and physical examination, through experience with real and/or simulated patients or by role playing."

Out of 126 medical schools in North America, only Rush Medical College (RMC) and a handful of other institutions, including McMaster University in Canada, Harvard, New Mexico State and Southern Illinois University, are utilizing a problem-based curriculum. (Harvard Medical School, in fact, established its parallel track program in 1985—one year after Rush. Two years later, it converted to problem-based learning for both preclinical *and* clinical study. No standard curriculum is offered.)

Rush University and Rush Medical College have had a longstanding commitment to innovation and diversity in education. After the Medical College became reactivated in 1969, the administration sought to provide students with a broader educational experience and the opportunity to care for patients in a rural area. For about 10 years, approximately 36 first-year students, out of a class of 120, participated in one-year off-campus programs at Knox College, Galesburg, Illinois, and Grinnell College, Grinnell, Iowa.

The termination of this off-campus program left an open niche for other innovative approaches to education in the health professions. Working with colleagues in the College of Education at the University of Illinois, Urbana, where he was involved in graduate work, Dr. Paul conducted an in-depth study of the problem-solving method of teaching and concluded that Rush could benefit from the program.

In 1983, Dr. Paul, Gerald S. Gotterer, M.D., Ph.D., and Phyllis Blumberg, Ph.D., laid the foundation for the AC program, along with Henry P. Russe, M.D., dean, Rush Medical College, and a cadre of dedicated individuals from the basic and clinical sciences. The pilot phase began in 1984 with eight first-year medical students. From September 1985 thru 1988, the program accepted 18 first-year students each year. Now in its sixth operating year, 20 students in the entering class of 120 were accepted. More than 100 students so far have benefited from the program, 50 of whom are now in clerkships or residency. "The program has grown, evolved and matured," says Dr. Paul, a Rush faculty member for 36 years. A grant from the Chicago Community Trust now helps to support the AC program.

"I've often said that student and faculty are paramount to the program's success," he says. "Faculty really get to know the students as bright, interesting people. It's very satisfying for them to watch the students develop into competent young physicians."

Dr. Paul stresses that teamwork has been the key to the program's longevity. Twenty clinical facilitators moderate the small group sessions and problem-solving exams. About 20 basic scientists serve as resource faculty and write the guidebooks, supervise seminars and laboratory sessions and are responsible for the evaluation of basic science content exams. Many faculty teach in both the traditional and the alternative curriculum.

Rush's AC has been designed as a true alternative—not a replacement—for the first two years of medical school—the preclinical years. Students completing the AC program at Rush enter the regular third- and fourth-year clinical curriculum along with students from the traditional preclinical program.

One alumnus of the AC program, Mary Brown, a third-year RMC student and former nurse for 12 years at the University of Illinois and Grant hospitals, credits the program with giving her a practical way to approach problems. She explains, "It's not possible to teach someone in four years everything they need to know, especially given the explosiveness of information in the medical field. This program explicitly teaches students how to be self-learners and to seek out the answers to their questions. It motivates because students *know* they can figure *anything* out using this systematic problem-solving process." (See sidebar article for current students' perceptions.)

"The Alternative Curriculum, with its problem-based curriculum, is perfect for students who are self-directed," says Henry P. Russe, M.D., dean, Rush Medical College and vice president, medical affairs. "Although this experience is not right for everybody, it gives students an important option of choosing which educational experience is best suited for them."

Dr. Russe feels that this educational experiment has been a success. "It has established Rush as a premier learning institution. Students in both programs have benefited, as some material learned in the AC is directly applicable to the traditional curriculum."

Appointed as assistant dean for the preclinical curriculum in September 1989, Thomas Bleck, M.D., hopes to incorporate methods

"The case study method is how a physician practices—what better way to teach students?"

C. Anderson Hedberg, M.D.

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worked out in the AC into the traditional curriculum by expanding the clinical correlation conferences which were instituted in the regular curriculum two years ago. For example, students may learn something about the heart in anatomy, physiology, biochemistry and histology. But, by analyzing a carefully written case of heart disease, students may achieve a better understanding of how a physician applies information from *all* these disciplines to solve clinical problems and care for patients.

Dr. Bleck, associate professor, neurological sciences and internal medicine, has been involved with the AC program since its inception, helping to conceptualize and plan the program. He teaches in the neurosciences section of the AC program and lectures in neurobiology in the regular curriculum.

Each of the five years he's taught in the neurosciences, the AC curriculum has been revised substantially. "We're actively experimenting with it all the time," he says. He recalls that the first full AC class, consisting of 18 M-2's, took the 12-week neurosciences course in the fall of 1986. The course, which covers neuroanatomy, neurophysiology, neuropathology, neuropharmacology and neurological physical diagnosis, has changed and evolved since that time.

Dr. Bleck explains, "In the first year we were too optimistic about how much reading the students could handle. In ensuing years, we've tried to find material that could cover the same information but in a shorter amount of time. The first year, all neurology problems were presented during laboratory sessions. Since then, although laboratory sessions continue to be held, more problem-solving sessions are devoted to the neurosciences."

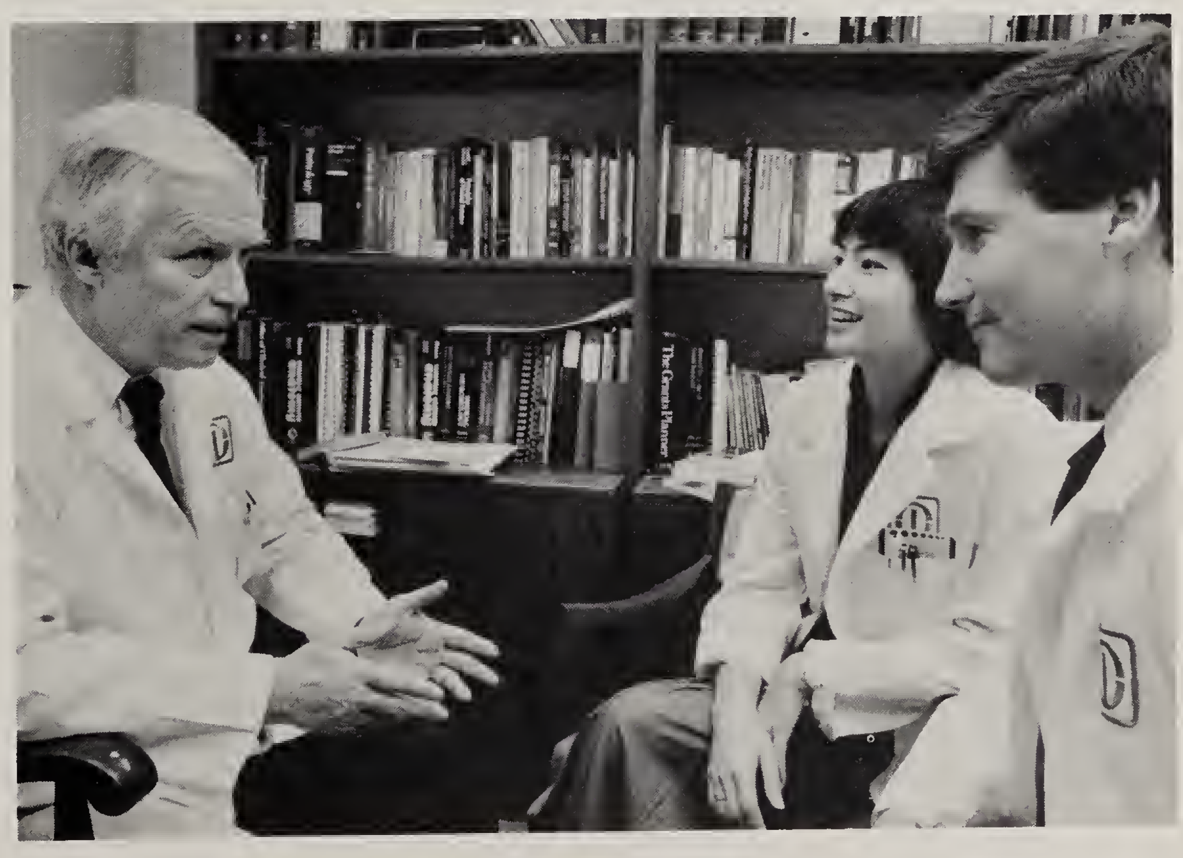
Dr. Bleck, a 1977 Rush Medical College graduate, says he would have jumped at the chance to be in the AC program if it had been available when he was a student. "I'm not someone who finds lectures an effective medium for learning. There are good students who do very well in that format and others who do very well in the alternative program.

"Those of us in the AC have the bias that problem solving can be taught and that students can acquire habits of self-study that will keep them current throughout their lives."

Scientific Content

The AC is designed to integrate and reinforce basic science knowledge, problem-solving skills and clinical skills. The content has been developed to integrate the learning units across preclinical disciplines rather than having them taught as separate courses. For example, biochemistry, microbiology and immunology are combined in the freshmen year, while pathology and pharmacology are taught in a six-month interval in the sophomore year. The examinations are written and scored by faculty from all the disciplines concerned.

When commenting on the rationale for combining pharmacology, pathophysiology and pathology into one "Superblock" course, C. Anderson Hedberg, M.D., AC course director of pathophysiology and associate professor, internal medicine, says, "The information is not used separately, so why should it



Alternative Curriculum students Tiffany Tom and Mark Reinke exchange ideas with Harold Paul, M.D., M.P.H., program director.

"This program teaches students how to be self-learners..."

Mary Brown

be taught separately?"

According to Dr. Hedberg, all major medical categories are presented in the Superblock, held in the winter and spring quarters of the M-2 year. Each week, students study a new case which is indicative of how a physician practices.

Dr. Hedberg recruits the faculty who serve as resource people, enlisting the expertise of hematologists, endocrinologists, gastroenterologists and other clinical subspecialists. "The instructors are actively involved in taking care of patients, in research and in teaching," he says. "They are enthusiastic, knowledgeable and interesting."

Among his goals, Dr. Hedberg would like the Superblock phase of the AC program to be even more integrated across disciplines, for example, incorporating more psychiatric issues into the cases, such as how a diabetic patient deals with dialysis treatments.

Dr. Hedberg's enthusiasm for the AC program is obvious. "The case study method is how a physician practices—what better way to teach students? We want them to be proficient at analyzing data, problem solving and seeing the patient as a whole person as they prepare to integrate the science of medicine with the art of medicine."

Problem Solving

Whether its learning a science or deducing what's wrong with a patient, the need to problem solve

What AC Students Say

Although out-of-state applications to Rush Medical College have increased 20 percent, Harold Paul, M.D., M.P.H., project director for the Alternative Curriculum (AC) program, says its difficult to determine whether the AC program is responsible. But as one out-of-state student put it, "When I saw the AC program in the catalog, I was intrigued. Any school that has the creativity and guts to offer such a program simply had to be investigated further."

Both Tiffany Tom and Mark Reinke, current M-2 students, were drawn to Rush because of the AC program. Like many AC students, their backgrounds are diverse. Tom earned a B.A.S. in German studies and biology from Stanford in 1987, and subsequently an M.S. in marine biology. Reinke received a B.S. in business in 1979 from the University of North Dakota, served for six years as a pilot in the U.S. Air Force and drove an ambulance in Fargo, North Dakota for a year.

Reinke says, "I liked the fact that Rush has a self-directed, problem-based clinical teaching curriculum. They really do teach you a new way to think." Tom likes the fact that AC students have an active role in planning their education, as the program is not opposed to change. Each course/program is evaluated twice by participants—once while they are students and once after they become physicians. Feedback sessions are held once a quarter so students can voice their opinions.

"Faculty listen," Tom says, "because the program constantly seeks to modify and improve itself. The AC programs that previous graduates participated in are vastly different than the program we're involved in."

How do the grades of students in the AC and regular curriculum compare? Dr. Paul says that by conventional measures the AC students are doing "very well" on major examinations.

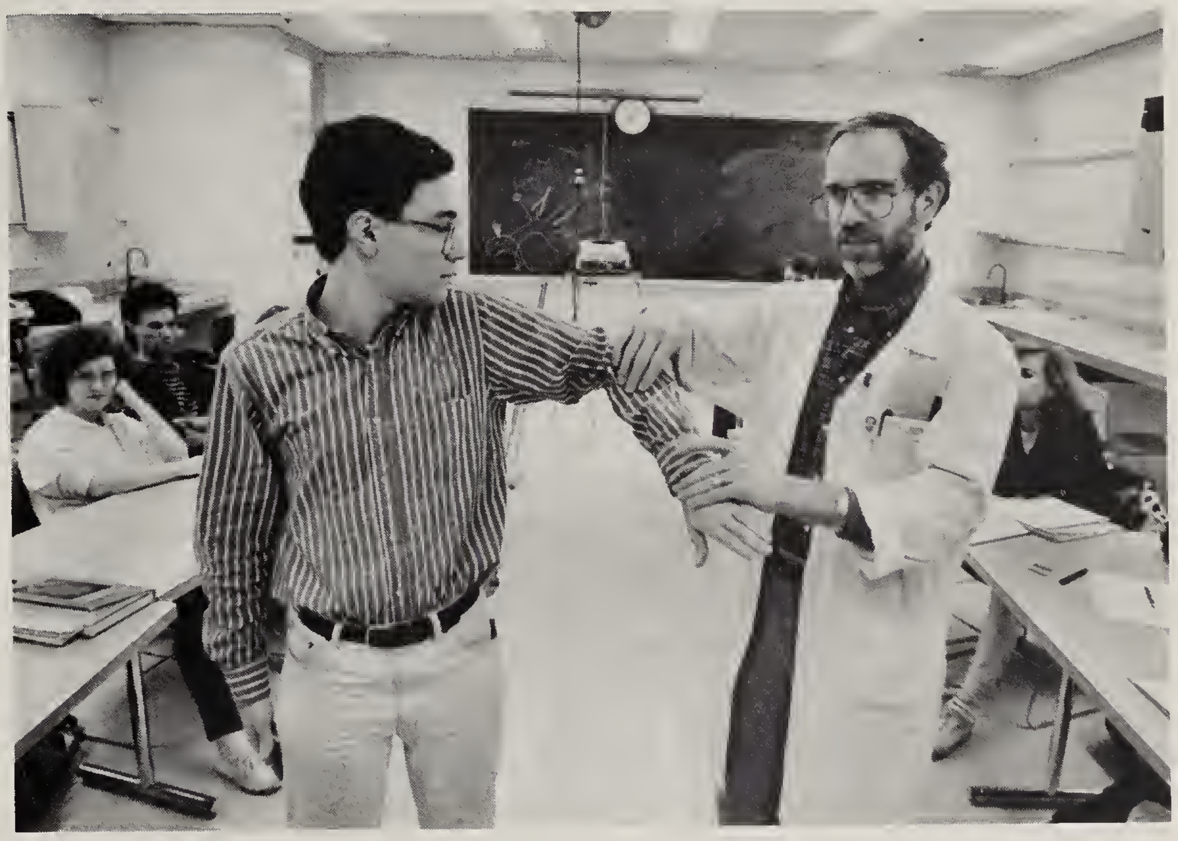
Both Reinke and Tom confess they had to overcome obstacles in self-directed learning. Tom's biggest problem was not wasting her free time and feeling tempted to be doing something else while she should be studying. Reinke stresses, "You have to sit down and study because cramming one or two days for a test isn't going to cut the mustard."

Being able to communicate and to glean important information from resource materials after hours spent in the library is crucial—something that is now old hat to Reinke and Tom. However, in the beginning it wasn't easy. Reinke recalls when his group disbanded to the library after their first problem-solving session in the M-1 year. "The case sounded a bit like a diabetes case because the boy was missing an enzyme. I frantically tried to absorb material in ten different books and even looked in hematology manuals. I wasn't sure where to start and there was no one to provide you with the answers."

As the students got better at problem solving, they were able to ascertain what was and wasn't important. As Tom concludes, "You have to prioritize your learning. Self-directed study and problem-solving, I'm certain, will be used throughout my career as a physician. The AC program is a gem."

"Self-directed study and problem-solving, I'm certain, will be used throughout my career as a physician."

Tiffany Tom



Charles E. Dinsmore, Ph.D., associate professor, anatomy, and director of anatomical sciences for the Alternative Curriculum, reviews the musculoskeletal structure of the arm, using M1 student Stephen Capen as his model.

is crucial. As Howard Zeitz, M.D., director of problem-solving activities for the AC program and an associate professor, immunology/microbiology, explains, "The focus of the problem-based curriculum is for students to see the problem and make their own decisions about what they need to learn in order to solve it."

According to Dr. Zeitz, there's a misconception that physicians and medical students know instinctively how to solve problems and that they will learn material even if they're not formally instructed in problem solving. To eliminate the misconception, three years ago a team of six Rush faculty members developed the two-year problem solving curriculum. "Other schools make the assumption that students will learn about problem solving, but Rush is the only school that has a formal course of instruction in problem solving skills via the case history-based method," he stresses.

The cases are designed specifically to assist students in acquiring knowledge about basic sciences and in improving their problem-solving skills under faculty supervision. "Students in the AC develop great skill in defining what they don't know in relation to what they need to know," Zeitz says. "As students work to acquire knowledge, they're constantly working on their problem-solving abilities."

Since the problem-solving curriculum of the AC program was implemented in the fall of 1987, considerable improvement has been seen in the students' problem-solving skill level. The elements of the problem-solving curriculum are introduced to students in a sequential fashion over two years. Students master each rung in the sequence before they advance to the next rung. Mark Johnson, an alumnus of the program who has taken a leave of absence from his medical studies to pursue a Ph.D. in biochemistry, says the AC program gave him a superb education. "Everyone should be exposed to this progressive style of learning. As information continues to grow exponentially, this style out of necessity is going to be the wave of the future."

Although Johnson initially had difficulty with the problem-solving phase of the program, he spent extra time with Dr. Zeitz during the summer between his M-1 and M-2 years to overcome a fear of being wrong in front of his peers. "Dr. Zeitz taught me it's okay if you're wrong in group and emphasized that the way of approaching the problem is the crucial point."

Introduction to the Patient

In the two-year Introduction to the Patient phase of the AC, students develop individual clinical skills, such as history-taking and physical examination through experience with real and/or simulated patients or by role-playing. Katharine Lofgren, M.S.W., has served as course director for Introduction to the Patient since 1984.

Like the other segments of the AC program, this area utilizes a building block approach. Under Lofgren's tutelage, a skills track and a variety of "hands on" workshops were developed to assist students with their observation and processing skills. Doctor/patient relationships, nonverbal communication and students' perceptions of themselves are among the topics

addressed by a multidisciplinary faculty in the first year.

Lofgren says, "The students get a clear message from faculty that this is an important course—85 percent of a diagnosis comes from what your patient tells you. You have to listen and allow the patient to tell his or her story without cutting them off."

The winter quarter builds on the students' observation and processing skills and focuses on medical history taking, particularly the history of the present illness. It is taught by a cadre of physicians, including psychiatrists, family practitioners, internists and pediatricians. Physicians role play with a particular organ system problem in mind.

One key component, according to Lofgren, is for students to determine what questions to ask and how to ask them. Students learn how to use their stethoscopes, and rudimentary skills of physical diagnosis, focusing on basic and surface anatomy, are introduced.

Composite patient information is introduced in the fall of the M-2 year, with about six students assigned to each of three facilitators, usually internists or family practitioners. Difficult clinical and emotional situations are covered, such as how to deliver the bad news of AIDS or cancer, or, in preventive medicine, how to counsel someone to change his/her health habits. A rigorous review of physical diagnosis, including neurological examinations, also is included. In the winter and spring quarters of the M-2 year (Superblock), students put their patient care skills to the test, spending one-half day a week at a Rush network hospital, MacNeal Hospital, where they examine, interact and take oral histories from patients under the guidance of a preceptor.

AC alumnus Mary Brown says, "I liked the way they taught us to approach patients. It was continually reinforced throughout the two-year experience—be respectful of the patients' feelings, don't badger them with questions and most importantly, *listen* to your patients."

Like anything new, the AC program is not universally accepted. Anthony J. Schmidt, Ph.D., professor and chairman, anatomy, says one of the biggest flaws is the absence of a solid laboratory program in the morphological sciences.

He also suggests greater faculty input and broader representation of faculty might enhance the program. "Anatomy covers several different disciplines that are interrelated," Dr. Schmidt says. "There isn't a faculty member who is considered an expert in all these areas. The same could be true of other disciplines in the basic sciences."

Alexander Templeton, M.D., professor, pathology, maintains that didactic teaching is effective. "Every society throughout history has utilized lectures. To abandon that cold turkey is a nice experiment, but I would think it is relatively unlikely that an ideal education would be devoid of lectures."

Although students receive a lot of individualized attention, Dr. Schmidt believes the real cost of such one-on-one instruction is underestimated. "We cooperate wholeheartedly with the AC program, but under constraints," Dr. Schmidt says. Dr. Templeton questions, "Can you *really* teach 100 students using this method?"

Advocates of the AC program insist that as the sheer bulk of material which medical students try to learn increases, it becomes impossible for it to be presented in lecture format. "We're more interested in teaching students how to use resources and how to analyze and solve clinical problems—something physicians do throughout their career," Dr. Bleck says.

In assessing the program, Dr. Paul sums up his sentiments, which are shared by many involved in the AC program. "The Alternative Curriculum program is maturing nicely. I am certain that in a few years it will be the Cadillac of medical education."

Fox Named Chairman of Neurology

Jacob H. Fox.,M.D., professor of neurology, has been appointed chairman of the Medical Center's Department of Neurological Sciences and the Jean Schweppe Armour Professor of Neurology.

Dr. Fox's special interest is in clinical issues involving patients with Alzheimer's Disease. He is currently director of the Rush Alzheimer's Disease Center and director of the Northern Illinois Regional Alzheimer's Disease Center. He is widely respected for his role in developing an innovative family care center for Alzheimer's patients at Rush. In 1987 he received the Humanitarian Award from the Chicago Area Chapter of the Alzheimer's Association, in recognition of his long and personal relationships with thousands of families of Alzheimer's Disease victims.

The Armour Chair, to which Dr. Fox was named, was established in 1963 in memory of Jean Schweppe Armour, a member of the Rush Woman's Board and a dedicated volunteer. It was the first chair in a private hospital in the United States.

Name Sprague Professor of Pathology

Victor E. Gould, M.D., is the newly-named Otho S.A. Sprague Professor of Pathology. A member of the Rush faculty since 1974, Dr. Gould is internationally recognized for his research in neuroendocrine tumor pathology. He is also currently serving as the editor of *Ultrastructural Pathology* and is a member of the editorial boards of a number of journals of pathology.

A native of Argentina, he earned the medical degree from the National University of Buenos Aires School of Medicine.

The Sprague Chair is named for a Chicago civic leader at the turn of the century.

Meyer Named Head of New Department

Dianne H. Meyer, Ph.D., has been named chairperson of the Department of Communication Disorders and Sciences. She is the first to hold this title in the department which was established in 1988. For the past seven years, Dr. Meyer has served as director of audiology in the Department of Otolaryngology and assistant professor at the Illinois Eye and Ear Infirmary.

Dr. Meyer holds the doctorate degree in audiology from Northwestern University. She is the immediate past president of the Chicago Speech-Language Hearing Association and has published widely in her field.

New System Unifies Patient Care Information

Rush-Presbyterian-St. Luke's is fast becoming a leader in the use of advanced computer technology in patient care information management.

"Out of the 7-to-8,000 hospitals in the United States, only a handful are trying systems similar to ours. We are in fact leading the pack," says William Wellman, M.S., assistant vice president, administrative affairs, who directed the creation, installation and beginning operations of the Medical Center's network of multi-function terminals.

The most ambitious addition to date in this network was completed on October 15, 1989, when Phase 1 of the Patient Care Information System (PCIS) became a reality for 2,000 users throughout the Medical Center. Users can access the system through more than 150 terminals and nearly 100 printers distribute information. More than one million patient records had to be converted to the new system!

The new system allows faster registration of patients; consolidation of inpatient and outpatient information; efficient ordering of meals, nourishments, supplies and occupational therapy; and improvements in billing processes. Especially important is that Phase 1 of PCIS was designed with the future in mind: it is a foundation on which to develop solutions to the ever-changing information needs of the Medical Center.

However, PCIS doesn't stand alone. In addition to the more than 250 functions available on PCIS, the system also serves to distribute information to many other computer systems throughout the Medical Center, in departments as diverse as the laboratory, finance and telecommunications (for telephone contact with a patient.)

It now sends an average of 4,500 information messages daily; during the first week in January more than 30,000 messages were sent, tracking the details of 517 admissions, 506 discharges and 485 transfers.

Like a linguist, PCIS interfaces "translate" whatever message is being sent into the "language" of the receiving computer. That eliminates printing out a message, delivering it to the appropriate department and having an operator retype the message into the receiving terminal computer.

But why spend seven years studying and designing, purchasing, installing, training and switching to a new system, when there are already terminals in position throughout the Medical Center? Here are some reasons:

Before PCIS, admissions staff had to type patient information into the SPECTRA system, then type the same information into the IBM system for patient billing purposes and, finally, type up a face sheet for the patient on a typewriter. Now one system does it all. Furthermore, time-saving features were added for clerks, such as indexing 1,000 insurance companies so addresses and other common facts do not have to be typed in.

Before PCIS, inpatient and outpatient data was stored in separate systems. Now, after an inpatient becomes an outpatient, that registration information is immediately accessible for outpatient follow-up care.

Before PCIS, when a new patient was registered, time-consuming phone calls had to be made from inpatient, outpatient and emergency room registration areas to obtain a medical record number which serves to keep track of patient information throughout the Medical Center. Now, new numbers are automatically assigned by PCIS, eliminating a large volume of phone calls which means less time spent by the patient at a registration area.

Also before PCIS, dietary orders were sent on paper through the hospital's tube system or by telephone. Now orders are entered into the computer on the patient care unit and automatically transferred to food and nutrition services.

What's next for PCIS? Wellman stresses that clinical professionals should be able to obtain the latest diagnostic information on a patient by simply entering the patient's name or medical record number. In addition, the latest medical literature related to the patient's diagnostic findings should be accessible through a few keystrokes on the computer's keyboard.

"Some at Rush have already taken up the 90s challenge of using computers to improve the patient care process," he says, "but physicians, nurses and allied health professionals still struggle in their efforts to communicate clinical information. The information systems' challenge for the 90s is facilitating the timely communication and management of this information thereby freeing the clinical professional's time." S.D.

Total Quality Process: A Way of Life at Rush

Three years ago TQM was just three initials to most Medical Center employees. Today, they represent a way of life at Rush.

"Total Quality Management (TQM) is a process - not a program. The heart of our TQM strategy is a commitment to change attitudes so that the focus of every employee, from top to bottom, is on improving the quality of our work," explains Medical Center President Leo M. Henikoff, M.D. "TQM underscores our longstanding tradition of commitment to quality and adds to it a new emphasis on doing things right the first time."

Rush's quality process, which was modeled after one developed for industry by the 3M corporation, is built on management leadership and commitment. 3M's model grew out of the quality management theories of Deming, Juran and Crosby. The model is designed to meet customer expectations, take action to improve quality and measure success.

While Rush has long maintained a reputation for quality, "our TQM strategy calls for going beyond professional standards of quality to address and define consumer expectations. Only in this way can we be successful in a highly competitive market," says TQM co-director, Marie Sinioris, M.P.H., president of ArcVentures, Inc.

"With TQM, we can also measure how successful our efforts are," she adds.

The Management Committee serves as the steering committee for TQM. John E. Trufant, Ed.D., vice president, academic resources; James P. Hill, J.D., associate vice president, human resources; and Sinioris co-direct TQM activities. James Schoenberger, M.D., is the medical director. Employees throughout the Medical Center have been designated as project coordinators and facilitators.

During the first two years, 3,000 employees were introduced to the concepts of TQM. By 1991, all Medical Center departments and all 8,000 Rush employees will be formally trained and actively involved in TQM. Meanwhile, employees are being gradually incorporated into the quality process in groups of a dozen or more departments at a time.

All this hasn't been without problems. "Our biggest barrier has been resistance to change," says TQM staff associate Maria Martel. "But I think a lot of the resistance stems from not understanding what TQM is all about."

"Put it this way," says Greg Knepper, M.S., assistant administrator and TQM facilitator. "How could you say no to a process where there were no 'guilty parties' in a problem, only a group of people trying to find a workable solution to a problem that everyone can live with."

Two years ago Michael A. Maffetone, D.A., director of the Office of Consolidated Laboratory Services (OCLS), was a director in search of a program to help build teamwork in the Medical Center's laboratories. "The labs consolidated administratively in 1982," he remembers, "and we needed to make this consolidation work effectively. TQM became that vehicle."

Dr. Maffetone and his laboratory managers took the TQM "tool box" and went to work. "We targeted our lab's 450 employees first and made them customers of management. Quite frankly, if you don't have a satisfied employee base to build on you aren't going to get much accomplished," he says.

Today, medical technologists, technicians and support staff form quality improvement plans and solve problems, working closely with their supervisors.

"We reduced the emergency room laboratory result turnaround time an average of 30 percent by stationing a laboratory liaison technician in the emergency room during the busiest hours," Dr. Maffetone reports. "And we instituted a week-long orientation to OCLS for all new lab employees."

The Idea of the Month rewards employees for good ideas. A recent winner was the design for a formal medical technologist student recruitment program in the Milwaukee/Detroit areas.

Maybe the most productive effort so far has been team building, facilitated by Mary DeNoble, M.S., training and organizational development. Barriers to effective communication and cooperation were identified and overcome.

All this has paid off. OCLS was one of 13 departments recognized last year for its quality improvement efforts.

Other new programs around the Medical Center are also the result of TQM. "At the beginning of the TQM process, the management committee identified seven priority concerns within the Medical Center. A management committee member became a champion for each priority," explains Dr. Trufant, who heads the communications task force. Out of this task force alone have grown several programs to make the Medical Center more "user friendly." The "Ask Me" Ambassador program made up of specially trained employees has made Rush an easier place to get around in for visitors. A Daily Events Bulletin Board at each Information Desk assists visitors in finding scheduled events. The Medical Center telephone directory has a section on where to go for what.

Monthly President's Luncheons and Breakfasts keep communication constant between upper management and staff at all levels.

Employee benefits have also improved. A dental plan is now in place in response to employee suggestion and long-term disability insurance is now available to an additional 3,300 hourly employees. Beginning July 1989, every employee must receive, at minimum, a written annual performance.

Integral to the TQM process is a tracking system to "let us know how we're doing. The success of every project is determined by customer satisfaction," explains Sinioris. Medical Center customers include anyone who receives the results of another person's work at the Medical Center, from patients and their families to referring physicians and benefits managers to employees themselves.

Periodic surveys to specific customer groups track how effective select TQM projects are. Under the direction of clinical department chairmen, clinical profiles are being developed as a measurement tool for professional standards of care.

Employees are also reporting successes. "The TQM process is set up so that you can look at the facts instead of guessing why a problem exists," says Diane Gallagher, M.S., R.N., unit leader, special care nursery. "It's helped us to quantify our time. We have discovered, for example, that certain x-ray procedures just take longer than we had estimated. By using TQM techniques, we solved problems we were having with radiology and now have a wonderful rapport with the department."

Anthony Richtsmeier, M.D., pediatrics, perhaps, sums up everyone's feelings toward TQM: "Through looking at the principles that guide the TQM process I have come to believe that good medicine and good business have much more in common than we would ever like to think. Everyone now seems to share our commitment to quality care." M.-A.R.

Unit Focuses Treatment On Special Phobias

It wasn't a typical case. He had traveled all the way from Hong Kong seeking treatment. But like many patients who come to the Department of Psychiatry at Rush, he was desperate.

A young man in his mid-20s, Peter Lee (not his real name) had an especially difficult time talking in front of people. University-educated, he spoke Chinese, French and English fluently. But he could barely carry on a conversation with a friend if the two of them happened to be in an elevator with someone who even looked like he might hold a position of authority.

Lee's heart would pound. He'd begin to perspire and anxiety would set in. He would feel extremely embarrassed and be overcome by a terrible fear that his whole face and neck had suddenly turned a telltale beet red.

This fear hindered him in social relationships and made his job as a salesman for an import/export toy company almost unbearable.

He had sought treatment in Hong Kong and even traveled to Paris, without success. Lee decided that he would find a cure in the United States.

He packed his bags and, on a two-week vacation from work, made his way across the Pacific. His only link here was a self-help group he had learned about called Agorophobics In Motion, headquartered in Detroit. That's where he learned about the expertise available at Rush.

"One Monday morning we virtually found him on our doorstep," remembers John Zajecka, M.D., clinical director of the psychiatry department's Treatment Research Unit (TRU).

Through clinical research, this unit provides innovative medical treatment generally not available in conventional psychiatric practice.

Six different studies now under way are focusing on treatments for panic disorder, anxiety, depression, obsessive-compulsive disorder and schizophrenia.

"There is a lot of evidence to show that these disorders are more biological than emotional, due to a chemical imbalance," Dr. Zajecka notes.

"Medications can immediately alleviate the symptoms but those currently on the market commonly produce side effects such as drowsiness, dry mouth, lightheadedness and dizziness. Our research is aimed at finding treatments that have greater specificity and less side effects."

More than 60 patients are currently participating in the various studies. Enrollment is ongoing. Interested patients who leave names and phone numbers with the unit's 24-hour answering service (312/942-3532) are called back by a TRU staff member to determine eligibility. Those who do not qualify for the drug studies are given appropriate referrals.

Each study usually takes anywhere from six to 12 weeks, Dr. Zajecka says. "These treatment methods appear to be helpful for patients who have never been treated for their illnesses, as well as for those whose illnesses have not responded adequately to conventional treatment."

Lee's problem was diagnosed as a type of social phobia, specifically erythrophopia, a fear of turning red. An extreme fear of being embarrassed. Since he had just two weeks here and did not fit into any of the studies going on at the time, a treatment plan was tailored specifically for him.

Medication—to stop some of the physiological symptoms, like the heart pounding—was the first step.

According to Dr. Zajecka, "It's only been very recently that clinicians have recognized that certain medications can help patients manage anxiety." Because Lee suffered from a social phobia, the medication was prescribed in conjunction with behavioral therapy.

Every day for two weeks, and sometimes even twice a day, Lee met with TRU staffers Joseph Fanelli, M.D., and Helen Jeffriess, R.N., administrative director, who together developed a program to "desensitize" him to those situations which he feared would cause extreme social embarrassment.

They began by having him make a list of scenarios that would cause him to be anxious and rate them 1 to 10, from least to most uncomfortable. Then they taught him self-relaxation techniques.

Lee learned how to focus his thoughts on the tension in his body and make a conscious effort to ease the tightness he felt in his muscles, gradually relaxing from head to toe. While he was fairly relaxed, they talked about each of the 10 scenarios he had listed. When Lee began to feel anxious they showed him how to use self-relaxation to deal with these feelings.

The next step was systematic de-sensitization. Lee was gradually exposed to those situations that he had said would cause him anxiety.

Jeffriess arranged for a Sunday brunch outing in Chinatown where Lee had to socialize with people he had just met. He stood before the TRU staff and answered questions, just as he might have to do in a sales presentation. Through special arrangement with the Medical Center's Department of Biomedical Communications, he was able to experience his worst fear—being on television. He even got a chance to see what it was like to operate the camera.

In each of these situations Lee was able to identify when he was anxious and use the techniques he had learned.

When it was time for him to go back to Hong Kong, he left with a set of audiotapes, made especially for him by Dr. Fanelli and Jeffriess, so he could continue to practice the relaxation techniques.

"He has continued to keep in touch and writes that he's now engaged to be married," Dr. Fanelli says. "Not only is he successfully asserting himself in his career, but he is also dealing with certain family issues that had been problematic for years and years.

"He had a lot of expectations coming over here," Dr. Fanelli adds. "We're pleased to see that things have worked out for him." K.K-K.

Staff Exchange Joins Rush with British

When London native Neal Brady, M.Sc (Econ), and his family journeyed to Chicago last spring as part of a one-year cooperative exchange program between Rush-Presbyterian-St. Luke's Medical Center, and St. Thomas' Hospital, West Lambeth, London, one of his main goals was to gain administrative experience in an acute care setting. The experience exceeded Brady's expectations... and then some.

During his first six months in Chicago, Brady was involved in a variety of projects at one of Rush's corporate affiliates, Rush North Shore (RNS) Medical Center in Skokie. He also helped facilitate the move of Sheridan Road Hospital's psychiatric services and substance abuse unit to RNS in July.

"I enjoyed the challenge of coordinating a great many activities in a short amount of time," he says. "In addition, I've gained a lot of insight into the management and organization of surgery at RNS through a review of operating room utilization and preadmission procedures."

Back at Rush during the last six months of his stay, Brady became familiar with Rush's complex system of payment for hospital services and how contracting with the sources of payment is accomplished. He was also able to view the Medical Center's development of corporate facilities master planning and to observe the commencement of the third Professional Building at Rush.

Brady says the Rush exchange experience came at an opportune time because many changes in health care delivery are occurring in the United Kingdom. He explains, "In the United States, you're used to a system when health care is independent from the government. In Britain, the National Health System is both national and highly political."

Central control is currently bringing about a new agenda for health and community care for the British people. The proposed change shifts the responsibility of meeting budgetary limits for health care as much as possible to local bodies or districts and, by special application, to large hospitals and general practice physician groups. "The government wants to bring market mechanisms into health care and to develop competition between suppliers in services," Brady says. "This will involve substantial changes over the next few years which I will help to facilitate at St. Thomas' Hospital and in the West Lambeth Health Authority, the health service district in which the hospital operates."

In London, Brady serves as director of development and planning for community and mental health services for the West Lambeth Health Authority (WLHA). In accordance with the philosophy of the British National Health Service, the authority is responsible for all the health care of the 160,000 residents of its districts. Acute hospital services are provided by St. Thomas' Hospital. In addition, WLHA also provides long-term psychiatric and supporting community health services. One of the oldest health care institutions in Great Britain, St. Thomas' is located in central London directly across the Thames River from the Houses of Parliament.

The cooperative exchange program between Rush and West Lambeth Health Authority, now in its third year, was established at Rush in 1986 through contacts that Chris Newman, M.B.A., associate vice president for corporate planning and market research, made while working there in the mid 1970s. The program is directed by Wayne Lerner, Dr.P.H., vice president, administrative affairs and chairman, health systems management (HSM). During the one-year program, which focuses on management operations, exchange fellows take up full residence and are an integral part of the administration. Fellows are salaried by their parent institution.

"The exchange provides an opportunity for personal and professional development for administrators at Rush and our sister institution," Newman said.

Two administrators from each institution have thus far benefited from the mutual exchange, and Rush will soon be naming its third exchange administrator. A third person from London is expected to arrive at Rush this fall.

In addition to the exchange program, Newman arranged with The Special Trustees of St. Thomas', the sponsors of the British side of the program, for St. Thomas' to host summer interns from Rush's Department of Health Systems Management. The program is for students who have completed the first year of the two-year HSM curriculum and was started in the summer of 1988. The department is currently selecting the third intern for the summer of 1990.

Paula Douglass, M.A., assistant vice president for corporate planning and government affairs at Rush, returned from her one-year London fellowship in early October 1989, rejuvenated by the experience. "I saw it as an opportunity to expand my horizons by working in a completely different health care delivery system. I think I now have a broader perspective as a result of my year in London."

While at St. Thomas', Douglass continued the work that Rush's first exchange fellow, Ronald Whitaker,

Exchange program participants, Paula Douglass, M.A., of Rush, and (right) Neal Brady, M.Sc., St. Thomas, with Chris Newman, M.B.A., Rush associate vice president, who helped establish the program.

M.S., now associate vice president for Rush-Presbyterian-St. Luke's Health Plans, Inc., began. He spent February 1987 through April 1988 laying the ground work for a new structure whose purpose is to involve physicians, as clinical directors, in the hospital's management.

"I was very impressed with the National Health Service. They do a marvelous job of managing the resources made available to them," Whitaker says. "It was interesting to work with similar management styles in a different environment."

Douglass' efforts were focused on developing systems for providing the newly appointed clinical directors with information they need to manage their services. "Despite its substantial computer capability, St. Thomas' managers largely relied upon manual systems for data collection and compilation, because the computer-generated information lacked credibility," she says. "Much of my time initially was devoted to identifying data problems and developing means of resolving them in order to restore managers' confidence in the information. I then worked with the clinical directors to develop a series of monthly reports that provide patient utilization information that is meaningful and useful to them."

Douglass calls the experience both exciting and undaunting. "The people I worked with were warm and hospitable and went to great lengths to make me feel a part of the place," she says.

Although Brady had initial anxieties about developing an understanding of the totality of the Rush mission, he found Rush employees extremely helpful in explaining their particular responsibilities in the organization. "It's now as clear to me as to anybody else in the organization," he says. "This is an unrivaled experience. I hope Rush has benefitted from the perspective I bring from working in the National Health Service and, particularly, in providing programs in community services in conjunction with acute care services."

Despite the fact that the United Kingdom and the United States share the same language, both Brady and Douglass attest that there are differences. For example, what Americans refer to as attending physicians are consultants in the UK. The term physician is only used to describe nonsurgeons, and surgeons are addressed as mister, not doctor. The comparable nursing unit leader is called a sister in the UK. Upon his arrival at Rush, Brady recalls being puzzled when people asked him if he was acclimated. He points out, "The British version of the same word is acclimatised, with an 's' and not a 'z'."

The similarities and differences between the two renowned academic medical centers—Rush and St. Thomas'—are many. They are very similar in complexity, organization, location, size and structure. The 903-bed Presbyterian-St. Luke's Hospital had 28,066 admissions last year, while the 889-bed St. Thomas' had 31,492 admissions.

However, licensure and operating standards that are taken for granted at Rush are not so developed in the UK. The governance systems of the two institutions, at this writing, are very different. Rush is governed by an autonomous Board of Trustees, whereas the British government is funder and provider for all health care and community services. "For all but the last 15 of its 800 years of existence, St. Thomas' and Rush have shared a common form of governance—a Board of Trustees," Brady says. Under new laws which are in formation, Brady predicts that St. Thomas' will have this status reinstated in the near future.

In summing up the exchange fellowship, Brady says, "I'm thankful for the opportunity and for making many new friends. I hope the exchange visitors to London have a spectacular view like the one I've had of the Chicago skyline!" B.H.

Drug May Help Slow Parkinson's Progress

The progressive, neurological illness Parkinson's disease (PD) affects over 400,000 people in North America alone. Its early signs are subtle: a slight tremor, slowness of movement or some rigidity. As the disorder progresses, however, its physical and emotional toll can be devastating, robbing patients of their mobility and, in some cases, their independence.

Current drug therapies treat the symptoms of PD, but scientists have been unable to slow the progression of the underlying disease. Now, preliminary evidence from a major study offers hope to patients diagnosed with early PD. A newly approved drug, deprenyl, may provide the key to halting the neuronal degeneration inherent to the disease.

Rush, under the investigative direction of Caroline M. Tanner, M.D., is one of 30 North American sites participating in the ongoing DATATOP (Deprenyl and Tocopherol Antioxidative Therapy of Parkinsonism) study. Of the 800 patients being studied, 60 are enrolled at Rush, the largest number of any center.

"Our preliminary results show that 10 milligrams of deprenyl taken daily significantly delay the time when levodopa therapy is required to treat serious disabilities," explains Dr. Tanner, associate professor, neurological sciences.

The cause of PD is unknown, but the chemical abnormalities and brain areas involved in the disease are fairly well understood. As the disease develops, a specific class of nerve cells in the brain begin to deteriorate. The chemical produced by these cells, dopamine, plays an important role in mediating control of movement and posture. As these dopamine-producing cells are lost, a patient's movement and balance become impaired.

Levodopa, the primary (and most effective) symptomatic treatment for PD, replaces the brain's supply of dopamine, temporarily masking PD's symptoms and restoring some mobility. Levodopa, however, does not slow the neuronal degeneration that causes PD to progress, and the drug's long-term use is associated with adverse side effects.

Does deprenyl delay the onset of disabling symptoms by halting the disease process? "This remains to be seen," says Dr. Tanner. "It appears that deprenyl slows the clinical progression of PD symptoms, but at this early stage we don't know for certain that deprenyl actually slows the nerve cell degeneration associated with the disorder."

Patients initially enrolled in DATATOP had early, untreated Parkinson's disease, and therefore exhibited minimal symptoms. Because many of the subjects are under the age of 60 and are employed full time, disease progression presents a potential threat to their livelihoods.

"Even if the effect of deprenyl is entirely symptomatic, Parkinson patients treated in the early stages of illness will benefit, if only from a longer period of mobility before their symptoms warrant levodopa treatment," says Dr. Tanner.

In the research community, the DATATOP findings have created an atmosphere of cautious optimism. Scientists cannot yet explain why deprenyl works, but its apparent effects have fueled fascinating theories. One idea is that PD is the result of exposure, in susceptible individuals, to an environmental toxin.

Certain synthetically created chemicals, including a compound known as MPTP, have been determined to cause parkinsonism, a syndrome which resembles classic PD. Although a complete understanding of MPTP's action remains elusive, it is known that the compound is not toxic until it enters the brain and is oxidized by the enzyme monoamine oxidase B (MAOB). Deprenyl blocks the activity of the MAOB enzyme. In animal studies, treatment with deprenyl before MPTP exposure prevents the neuronal damage produced by MPTP.

Dr. Tanner, who has extensively studied the link between PD and the environment, believes that the DATATOP results lend credence to the idea that PD may be caused by exposure to an MPTP-like toxin.

"We know that deprenyl inhibits the enzyme MAOB. Perhaps deprenyl stops neuronal deterioration by 'disarming' MPTP-like compounds before they become toxic," she speculates.

In other attempts to slow disease progression, scientists are studying a nerve growth factor, or "trophic factor" which may stimulate the growth of neurons—including the dopamine-producing cells lost in PD.

"This idea isn't all that farfetched," says neurochemist Paul Carvey, Ph.D., assistant professor, neurological sciences. "We've known since the 1950s that a neurotrophic factor plays a role in fetal development of the central and peripheral nervous system. Within the past decade, it's been discovered that this trophic factor exists in the adult nervous system as well, and that it may contribute to the growth and repair of neurons."

In earlier research, Dr. Carvey and his group discovered an antibody, likely related to the dopamine neuron, in the cerebrospinal fluid of PD patients. In lab studies, this antibody has been shown to "attack" dopamine neurons. Based on the results of this and subsequent research, Dr. Carvey believes that the release of a trophic factor may cause this antibody to disappear from a PD patient's central nervous system, stimulating the "rescue and repair" of damaged dopamine neurons. If this is true, PD may involve the loss of this trophic factor; reinstating it could slow the disease process.

Dr. Carvey has been a key figure among the scientists who are studying the role of a trophic factor in the adult central nervous system. Their goal is to isolate this factor and manipulate it in a laboratory setting, determining if it can be used to initiate cell growth. He and his colleagues hope that this technique will compensate for the cell loss that occurs in PD.

"We hope to find a way to 'turn on' a trophic factor which has been 'turned off' by whatever causes the the disease," says Dr. Carvey. "If we can do this, we'll have a revolutionary treatment for PD, as well as other neurological disorders which involve neuronal damage, including Alzheimer's disease. Instead of just treating the symptoms of these disorders, we'll be able to slow the disease process itself." C.J.

Center Treats Children's Varied Sleep Disorders

Most of us associate sleep laboratories with the study of dreams, sleepwalking and insomnia. Within the Medical Center, however, is a sleep laboratory where researchers investigate another aspect of the unconscious: breathing control disorders which occur primarily during sleep.

After seven years of work at Children's Memorial Hospital, investigators moved to Rush in the fall of 1989 and established the Center for Disorders of Respiratory Control in Infancy and Childhood. The center's staff includes director Debra E. Weese-Mayer, M.D.; associate director Jean M. Silvestri, M.D.; respiratory therapists Anna S. Morrow, CRRT, and Linda P. Conway, CRRT; and biomedical engineer Gary A. Barkov, M.S. As a team, they evaluate and treat pediatric disorders caused by deficient respiratory control. These disorders include apnea, apparent life-threatening events (ALTEs), obstructive sleep apnea (OSA), and a rare condition called central hypoventilation syndrome (CHS).

"We see a lot of difficult patients—children with complicated and unusual problems," says Dr. Weese-Mayer.

The problem most commonly seen at the center is OSA, a disorder characterized by snoring, difficulty in breathing and pharyngeal airway obstruction during sleep. Because physicians usually see children when they are awake and symptom free, diagnosis of OSA is often missed for months, even years. While not definitively life-threatening, chronic OSA can wreak havoc with a child's sleep and respiratory patterns, resulting in sleep-related asphyxia, excessive daytime somnolence, school problems, and even retarded growth and potential brain damage.

"The common reason OSA occurs—enlarged tonsils or adenoids—is easily identified and treated. Cases referred to us, however, usually involve a more elusive cause. For these children, sleep lab evaluation can be a great benefit," Dr. Weese-Mayer explains.

In the sleep lab, clinicians monitor a child's respiration, oxygen and carbon dioxide levels, heart rate, airflow and sleep state during sleep. They count the number and duration of obstructive and central apneas, the severity of airway obstruction, and the level of oxygen versus carbon dioxide. If surgery seems indicated, upper airway fluoroscopy conducted during sleep can help to identify the exact site of the obstruction.

The team at the center also investigates and treats ALTEs—frightening episodes in infants and children characterized by a combination of apnea, bluish skin discoloration, extremely limp (or rigid) muscle tone, and choking or gagging. Although there are no conclusive findings linking apnea to subsequent sudden infant death syndrome (SIDS), researchers suspect that recurrent ALTEs requiring cardiopulmonary resuscitation are related to SIDS.

"Our first approach is to try to determine and treat the cause of an ALTE. It could be an airway obstruction, an infection, or another tangible, discernible cause," says Dr. Weese-Mayer.

If a specific cause of an ALTE is adequately treated and not likely to recur, the infant is not considered to be in danger, she explains. For certain high-risk infants, however, a home cardiorespiratory monitor is indicated. Such a monitor sounds an alarm when breathing abnormalities or slowing of the heart rate have occurred. This monitor alerts caretakers to respond and intervene, and may prevent a subsequent fatal episode.

In evaluations of children who have symptoms of apnea or ALTEs, the center sometimes uses a computerized event recorder in conjunction with a home monitor. The event recorder stores cardiorespiratory data related to "events" such as apnea, slow heart rate and ALTEs and is used over a two- to three-month period. As these researchers have recently demonstrated, home monitors generate a high number of false alarms. With event recording, the center's staff can determine which, if any, alarms are physiologically significant. The event recorder also provides the staff, who rely in part on parental reports, with a more precise and objective record of a child's problem.

Debra Weese-Mayer, M.D., monitors a patient in the sleep lab.

Another disorder treated at the center, CHS, has a neurologic as well as physiologic origin. CHS is presumably caused by abnormalities in the brainstem centers that control breathing, resulting in inadequate ventilation, particularly during sleep. Until recently, severely ill CHS patients either died or had to be maintained constantly on conventional ventilators.

Diaphragmatic pacing is an innovative treatment which offers these patients a new option. The pacer consists of a small, external radio transmitter and surgically implanted internal components. The internal components receive radio frequency signals from the transmitter and transform them to electrical pulses that stimulate the phrenic nerves. This nerve stimulation causes "breathing"—the diaphragmatic action that normally occurs when the phrenic nerves respond to messages sent by the brain.

Pacing has been used to support breathing in adults with CHS and quadriplegia. Dr. Weese-Mayer's team, however, has extended this technology to the treatment of 34 infants and children—the largest population of paced children in the world.

"In the old days, children with severe cases of CHS would be virtually immobile, connected to a ventilator 24-hours-a-day. The pacer is compact and can be carried around quite easily. It can help to give CHS patients something of a normal life," says Dr. Weese-Mayer.

The center's ultimate goal is to treat children with disorders of respiratory control for whom there might otherwise be no help.

"Because we're so specialized, we're well-equipped to diagnose and treat children who present puzzling diagnostic dilemmas. For many parents, a center that offers these unique services is their last hope for evaluating and treating their child," concludes Dr. Weese-Mayer. C.J.

Sharing Shifts Works For Twin Nurses

Can job sharing help solve the nursing shortage? Asking Nancy McGuire, R.N., and her twin sister Margaret Richard, R.N., elicits answers almost as identical as they are.

The two have been working the same unit, filling a single nursing position, since they proposed this solution to their supervisor about five years ago. "It's ideal," McGuire says. "It's worked out from every angle." Richard also uses the word ideal, and says, "...it's perfect, the best of both worlds."

Although their job-sharing prerequisites were defined from the vantage point of personal needs and goals, their experience offers a prototype for successful job sharing. Three key elements to job sharing are having partners with similar skills and background, precisely organized plans on how to carry out the division of labor and an agreeable administration.

When McGuire and Richard first proposed job sharing, they were each working full time on a medical/surgical floor at Presbyterian-St. Luke's Hospital.

McGuire had begun her career as an LPN and returned to school while working at the Medical Center, completing her degree and becoming an R.N. Her sister Margaret had taught in the parochial schools and was looking for a way to work part time. "Part time in the school system is substitute teaching," Richard says, "and that's essentially just baby-sitting". So Richard acted on her sister's suggestion of going into nursing, added a bachelor of science degree to her credits, then joined the full-time medical/surgical staff.

Because each wanted to start families, they submitted a proposal to their supervisor that McGuire take the evening shift every Monday and Tuesday and work the day shift on alternate Saturdays while Richard would work Wednesday and Thursday evening shifts and the day shift on alternate Sundays. They also split the duties of charge nurse and preceptor for new graduates.

"You have to understand, our benefits are not the same" McGuire says. "That's because I've been an employee here for 18 years and my sister has only been here for seven." But they have retained seniority and retirement benefits and receive the same pay rate as full timers.

Both nurses say that communication is most important between time-sharers. As Richard puts it "You can't be afraid to tell your partner if she's done something wrong."

Sharing their responsibilities has enabled McGuire and Richard to share child care also. McGuire recently had a second daughter. Her oldest girl is four. Richard has a daughter, three, and is expecting a boy in seven weeks.

Although not a prerequisite for all job-sharers, the two families live within a few blocks of each other. Except for time out for pregnancies, the twins meet daily to discuss their patients while they jog.

When asked if in their experience job sharing could be a solution for hospital administrations struggling with the nurse shortage, their answers are personal and definitely enthusiastic. Richard states, "Job sharing can help people not to burn out so fast. The beauty of it is that nothing can be overwhelming in two days or so. I can dedicate myself to doing the best I can do and keep going because in two days it's not going to wear me out. It's hard work, but I feel as if I'm contributing something. I love my job."

And McGuire adds, "A lot of trained, good nurses really want to work. I think job sharing is a solution for a lot of people." S.D.

Dispelling Myths and Caring for Incontinence

True or false? Incontinence, or loss of bladder control, is an incurable, inevitable complication of aging.

"This is a common myth," says Peter K. Sand, M.D., assistant professor, obstetrics and gynecology and director of the Section of Urogynecology. "Incontinence is far from an exclusively geriatric problem, and it is not an inevitable part of aging. It's a disorder that is almost always treatable, if not curable, at whatever age it occurs."

In fact, incontinence plagues 25-40 percent of all women at some point of their lives, regardless of age. Unfortunately, most women fail to report the problem because of misconceptions they may have. Dr. Sand is one of only about 20 fellowship-trained urogynecologists in the U.S. He specializes in the treatment of female incontinence.

"There are only a dozen or so centers in the U.S. that have trained urogynecologists on staff. Rush is fortunate to have two," says George D. Wilbanks, M.D., chairman, obstetrics and gynecology.

Linda Brubaker, M.D., a urogynecologist who trained under Dr. Sand, is also a member of the Section of Urogynecology. Together, she and Dr. Sand offer a unique program, emphasizing non-surgical treatment of incontinence.

"Adequate treatment of incontinence starts with an accurate diagnosis. We typically spend four-to-five hours with women who are incontinent, evaluating their problem," explains Dr. Sand.

Because they see many complicated cases—patients who are often experiencing a number of urogynecological problems—the section utilizes a range of sophisticated diagnostic equipment. In a patient's initial evaluation, a series of clinical tests are utilized. These may be augmented by computerized tests called "multi-channel urodynamics," which provide a readout of bladder and urethral activity, similar to the information provided by an EKG. Small catheters measure abdominal pressure, urethral pressure, bladder pressure and other functions, enabling the physician to determine the exact source of a patient's problem.

Once diagnosed, the patient is presented with several treatment options. Because surgery can be difficult and is not always successful or long-lasting, non-surgical treatments are usually attempted first. One behavioral technique, bladder drill, requires the patient to void at specific, set times.

"While this seems simplistic," says Dr. Sand, "behavioral modification can cure two-thirds of the patients we see with involuntary bladder contractions. Behavioral techniques are effective because they give a patient control—they put the mind in control of the bladder."

For the remaining patients, medication, physiotherapy exercises, or biofeedback may provide relief. For others, an experimental non-surgical treatment—"pelvic floor stimulation"—has helped. The pelvic floor stimulator is a tampon-like device which employs low intensity electrical stimulation to strengthen pelvic and urethral muscles. The device is currently being used successfully in Europe, and studies for Food and Drug Administration approval in the U.S., including research conducted at Rush by Dr. Sand, have yielded positive results.

"What's exciting about this is the treatment's simplicity. Use of the stimulator is not painful or dangerous. It has no side effects and, most importantly, women can be taught to use the device on a daily basis in their own homes," says Dr. Sand. "For young, active patients, this therapy is particularly effective and convenient."

For incontinent, bedridden patients, Dr. Sand and his colleagues are examining the efficacy of "acute maximal pelvic floor stimulation." This treatment can be administered by a health care worker. Results from three European studies showed that the technique, when employed once a week for about 20 minutes, halted incontinence in 50 percent of the patients treated. Researchers at Rush hope that acute pelvic floor stimulation will provide a cost-effective way to treat incontinent nursing home patients. C.J.

Patient's Paralysis Eased by Unusual Surgery

Twenty-nine year old Joycelyn Reid was born with neurofibromatosis (NF), better known as Elephant Man's disease, complicated by severe kyphoscoliosis, a deformity of the spine often associated with NF. Ronald L. DeWald, M.D., professor, orthopedic surgery, has treated Reid's scoliosis since she was 13. At that time, using bone grafted from her hip, he performed spinal surgery, successfully realigning her spine.

As she grew older, the neurofibromatosis continued to progress. By January 1989 Reid was hearing a crackling when she moved her neck and in late April she began to experience paralysis in her legs.

When physicians once again recommended surgery, Reid's family contacted Dr. DeWald. He agreed that, although surgery was difficult and risky, without it Reid would be paralyzed.

"The chances for successful treat-

Ronald DeWald, M.D., evaluates Reid's posture and spine alignment one month after surgery.

ment were so low, and the risk of causing permanent paralysis was so great, that I hesitated to take on the surgery...," Dr. DeWald said.

Before surgery, in order to walk, Reid had to wear a "halo vest," a form of traction which consists of a metal ring fixed to the skull, connected by rods to a vest. The vest held the spine in proper alignment, much in the way a body cast would. This gave Dr. DeWald the inspiration for an innovative, complicated operation.

For the operation, besides using a bone graft, he used a new procedure to implant a Cortrel/Dubousset device, a spinal implant imported from France just for this surgery. The two-foot long steel device consists of a circle of metal with two long rods extending horizontally from it. The circle was attached to the base of the skull and the rods were attached to the spine.

"Twenty-four levels of spine vertebrae were fixed in this manner," said Dr. DeWald. "This provided Joycelyn's deformed spine with adequate support, ending her paralysis."

Within the next year, Reid will require additional surgery to further support her neck. For now, however, she is progressing faster than anticipated. Although she cannot move her head or neck, she is able to walk without the support of the halo vest.

"Joycelyn's case is special because we didn't give up," Dr. DeWald says. "The odds were against us, but perseverance and research led to a successful treatment. Also, the success of her surgery opens avenues for the treatment of other similar cases of instability of the cervical spine." C.J.

Chimp Bones Provide Osteoporosis Clues

Chimp bones sent to Rush by noted anthropologist Jane Goodall, Ph.D., are providing unexpected, valuable information about osteoporosis. In the study by John Lobick, M.S., (left), systems manager, diagnostic radiology, and Dale R. Sumner, Ph.D., an anthropologist and assistant professor, orthopedic surgery, cross-sectional CT scan images were done of chimp femur bones. The images showed that many older female chimps had significant loss of bone mass similar to osteoporosis. A computer-generated "density contour" (three-dimensional picture illustrating ranges of bone density) confirmed the finding. According to Dr. Sumner it is one of the few documented cases of age-related bone loss in a nonhuman population. "I can't say our findings will lead to a cure for osteoporosis," Dr. Sumner says, "but we now have a broader perspective on a bone disorder which was previously thought to be unique to humans."

Graduate Nursing Students Offered MBA Option

A dual master's degree program between the College of Nursing at Rush University and the J. L. Kellogg Graduate School of Management at Northwestern University offers nurses the opportunity to simultaneously earn a master's of science in nursing degree and a master's in business administration—in a shorter time than if each discipline was studied separately. The new program is one of only a few in the Midwest to offer a variety of clinical specializations in combination with business education.

"This program will prepare nurses to take some management responsibility in their jobs and still develop their roles as caregivers," says Kathleen Gainor Andreoli, D.S.N., the John L. and Helen Kellogg dean of the College of Nursing.

"Students enrolled in the joint degree program pick what nursing specialty they want to study at Rush," says Andreoli, "such as critical care, pediatrics or geriatrics."

Students also take 20 business courses at Northwestern, including accounting, finance and marketing.

Because of the way the courses

are sequenced, students are exposed to the world of management along with fellow business students, as well as to the clinical reality that is health care today, says Ann Minnick, Ph.D., R.N., F.A.A.N., director of nursing services and research support and director of the joint degree program.

Applicants must be accepted to both schools to participate in the program. To enroll in the graduate nursing program at Rush, students must have a bachelor's degree in nursing and an active nursing license, and take the Graduate Record Exam (GRE).

Northwestern requires that applicants have a bachelor's degree and take the Graduate Management Admissions Test (GMAT). Two years of work experience are also recommended.

The cost of the program for full-time students is about $15,000 per year. Prospective students are eligible to apply to The Commonwealth Fund Executive Nurse Fellowship Program, which provides 25 awards of $15,000 each for nurses enrolling in the joint program.

"Given the history of the last 10 years, we are going to continue to suffer from a shortage of nurses," says Andreoli. "Hopefully the joint program will make the nursing field attractive to more women and men."

Margaret Mahoney, president of The Commonwealth Fund, also hopes the program will make a dent in the nursing shortage. "We are very impressed with the potential of these new programs to make the very best of educations more accessible to nurses who set their sights on being tomorrow's leaders." J.R.

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Fall 1990

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volume 13/Fall 1990

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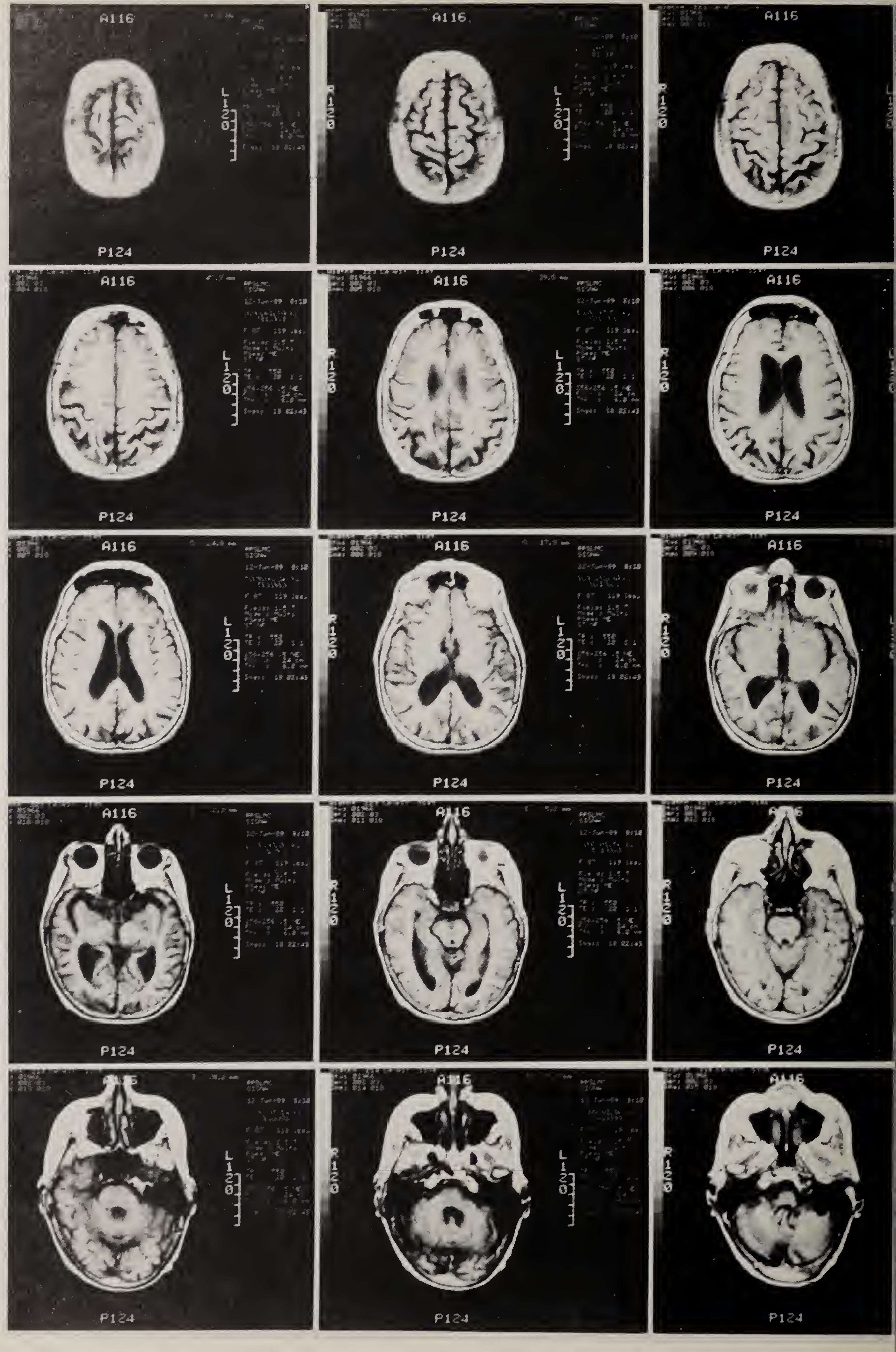
Nerve fibers seen under the microscope before (back cover) and after (front cover) exposure to nerve growth factor. Photos courtesy Paul Carvey, Ph.D., assistant professor, neurological sciences.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The Nervous System: Your personal computer

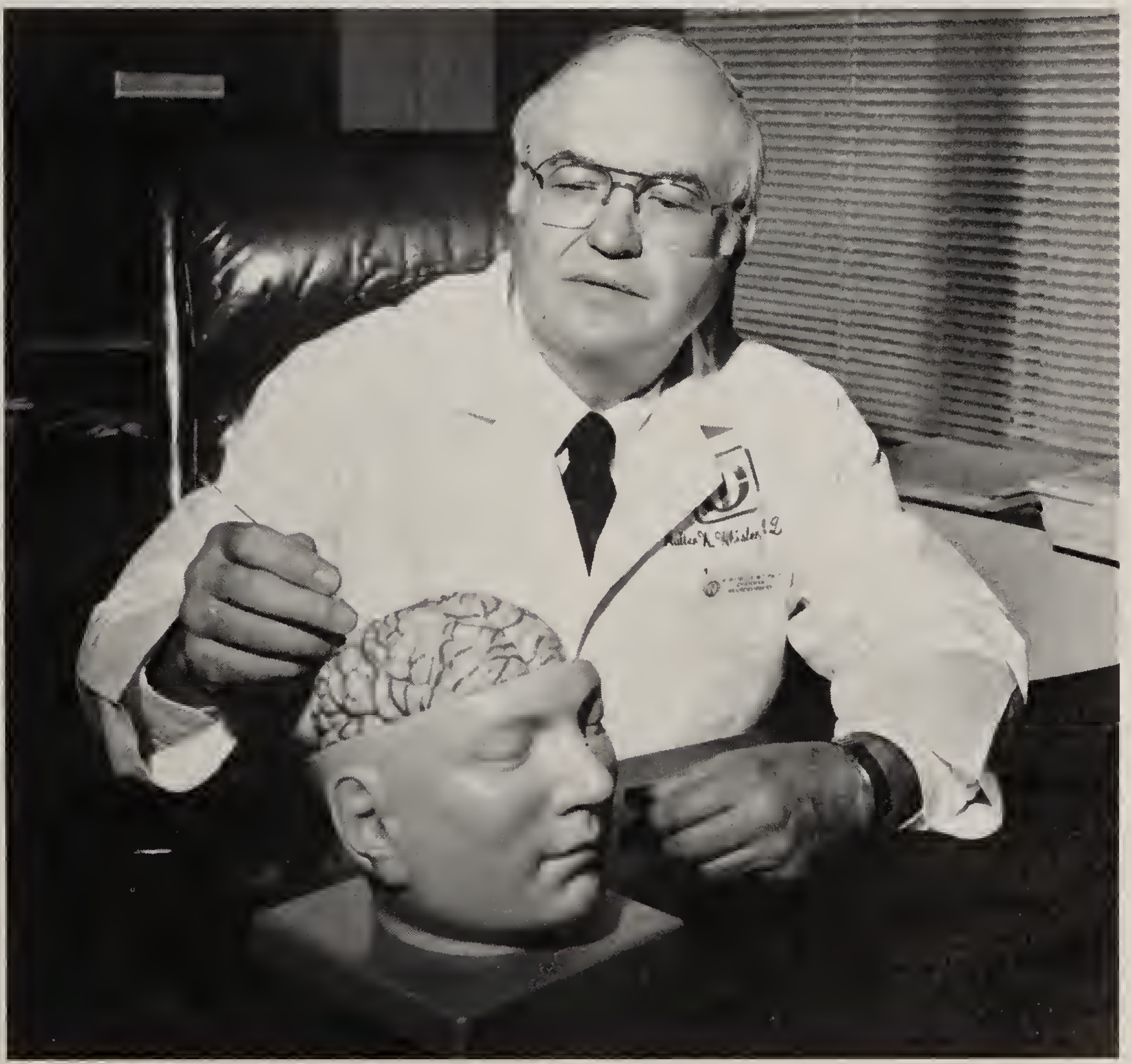
By Krys Kazieczko-Kuszak

Every single movement and activity of the human body is regulated by the nervous system. It may be automatic, like breathing. Or a relatively simple movement like snapping your fingers. Or a complex function such as reasoning or remembering. Everything you do, every sensation you feel, every thought you think depends on this network which includes the brain, spinal cord and millions of nerve cells.

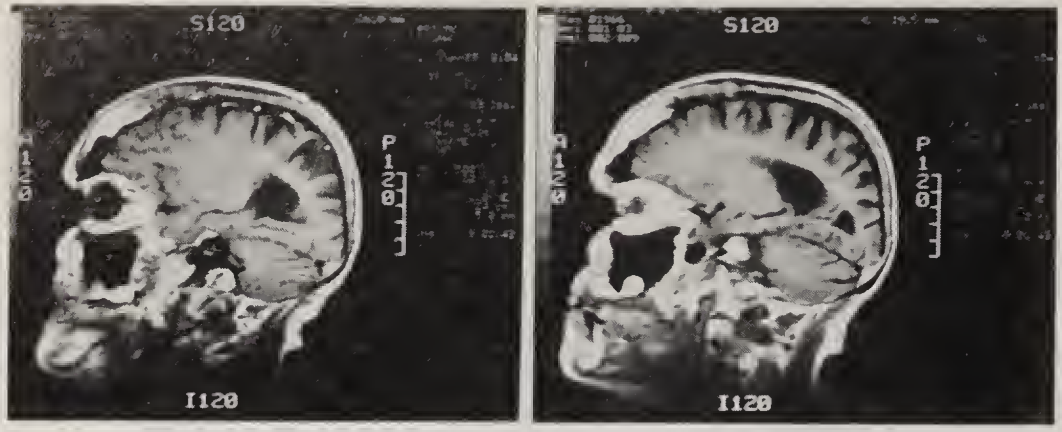
A breakdown in this control system might be recognized in symptoms such as headaches, dizziness, sore neck, back pain, numbness, tingling sensations, fainting spells or forgetfulness. "These are the most common symptoms presented by patients who come to us for diagnosis and treatment," says Jacob H. Fox, M.D., the Jean Schweppe Armour Professor and chairman, Department of Neurological Sciences.

Until recently, the main emphasis in neurology had been simply on diagnosis.

"When you look at history," Dr. Fox explains, "you see that those neurologists who have become famous were renowned for their brilliant diagnoses. The literature is filled with eponyms—such as Alzheimer's disease and Parkinson's disease—as neurologists who described particular disorders often had their names attached to the syndrome. But then there was noth-



Walter W. Whistler, M.D., Ph.D., indicates an area of the brain—the "computer" component of the nervous system.



ing that could be done about these diseases."

"Today, however," Dr. Fox emphasizes, "it's very credible for neurologists to talk about treating illnesses and not just diagnosing them."

What accounts for the change?

To some extent, Dr. Fox answers, there's been an explosion in our knowledge of neurobiology. "We simply know so much more about how the nervous system functions," he says.

A Look at the Basics

As the body's control center, the brain and spinal cord together form the central nervous system. The nerves of the peripheral nervous system connect the brain and spinal cord to all parts of the body.

The basic unit of the entire nervous system is the nerve cell or neuron. Sensory neurons carry messages to the brain or the spinal cord from the senses as well as from receptors in the muscles and skin. Motor neurons carry messages out to the muscles and glands.

While neurons differ in size and shape, all share some common characteristics. Each includes a cell body with nerve fibers—a cluster of short branches at one end called dendrites and a single long branch at the other end called the axon. Bundled together the fibers form peripheral nerves, which connect the brain and spinal cord to all parts of the body. The main nerves of the body are made up of just axons, which can be as much as several feet long.

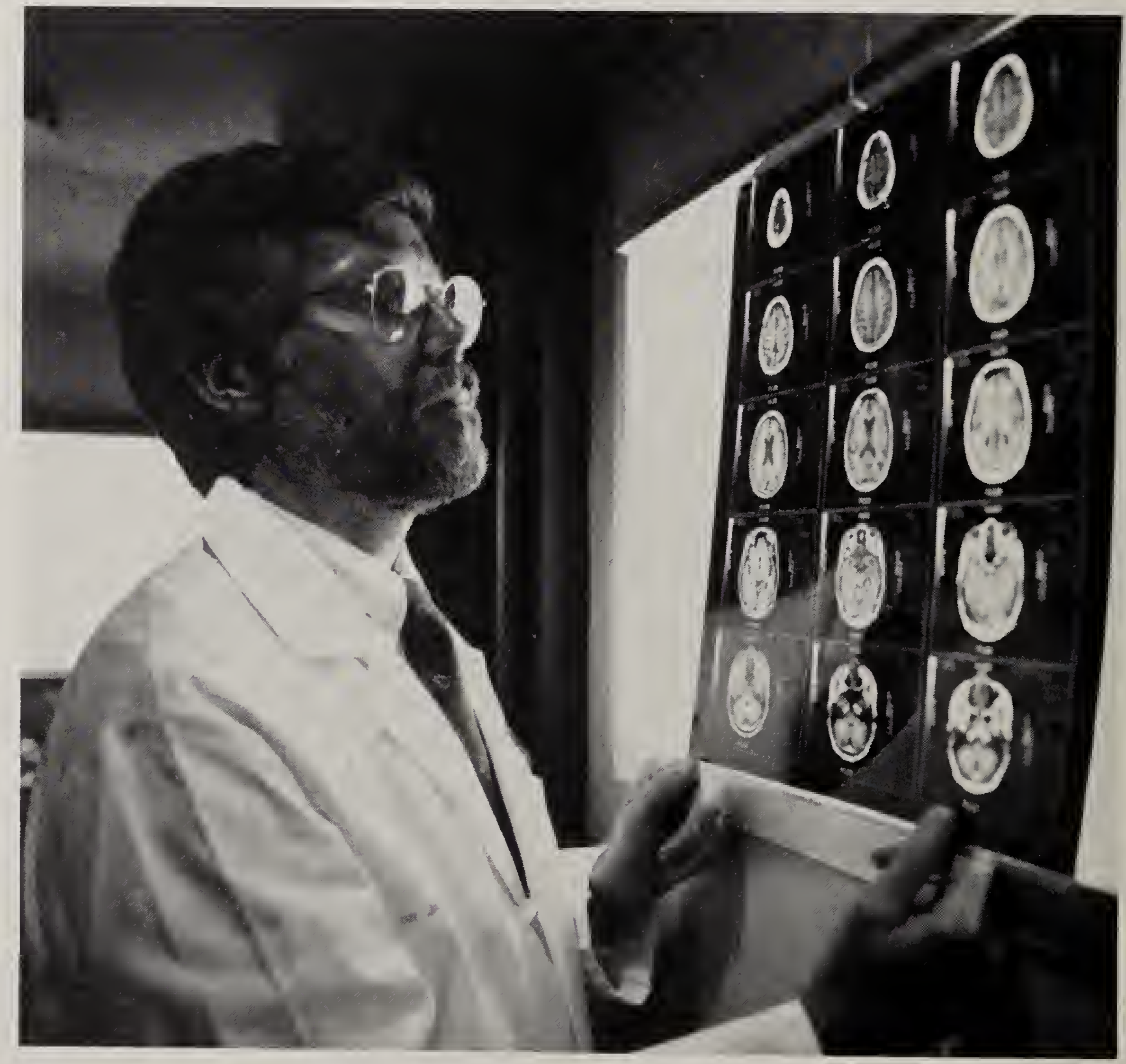
The neuron cell body itself is not part of the nerve. It is based either in the brain, the spinal cord or in a cluster of cell bodies called a ganglion. These cells are not capable of regenerating so if any are destroyed either through accident or illness, the loss is permanent.

Neurons communicate with one another by electrical nerve impulses. These signals are picked up by the dendrites, travel in a wave through the cell body and then leave through the axon. A white fatty substance called myelin, which coats most axons, acts as an insulator and helps the signal pass through the neuron.

To reach the next cell, nerve impulses have to jump across a small gap known as a synapse. A naturally occurring body chemical called a neurotransmitter, which is released by the axon, passes the impulse along to the next cell. Thus far, more than two dozen different neurotransmitters have been identified, including serotonin, dopamine, acetylcholine and norepinephrine.

Once the impulse reaches the dendrites of the next neuron, the neurotransmitter's job is done and the chemical is reabsorbed, deactivated or taken away by body fluids.

All this occurs quite quickly; impulses travel anywhere from about three feet to 300 feet per second.



Jacob H. Fox, M.D., views brain scans, one of the diagnostic tools for Alzheimer's disease.

> *"The brain is the computer. All sensory input—information from the eyes, ears and so on—goes into the computer where it is processed."*
>
> **Walter W. Whistler, M.D., Ph.D.**

The Body's Computer System

Overall, the nervous system can be described as the entire electrical and computer system of the body, says Walter W. Whisler, M.D., Ph.D., chairman, Department of Neurosurgery.

"The spinal cord is the cable," Dr. Whisler explains. "The nerves are the wires that connect the cable to all of its work stations. The brain is the computer. All sensory input—information from the eyes, ears, and so on—goes into the computer where it is processed. Decisions are made based on this information and then directions are sent out to muscles and glands to respond to maintain a stable internal environment."

Recent technological advances such as CT scans and magnetic resonance imaging are particularly important to the neurosurgeon in precisely identifying areas of malfunction. According to Dr. Whisler, about half of all neurosurgical procedures involve the brain.

The brain, which weighs about three pounds at adulthood, includes the cerebrum, which is responsible for thinking, reasoning, feeling and memory; the cerebellum, which regulates muscles and motion; and the brainstem, which controls heartbeat, breathing and digestion.

The right side of the brain controls the left side of the body; the left side of the brain controls the right side of the body. Different parts of the brain are concerned with different functions. While specific areas are control centers—for movement, for example, or speech—information stored in certain locations is also stored someplace else in the brain in a "backup file," Dr. Whisler explains.

"Depending on location, damage to a small piece of the brain just one-quarter inch in diameter can, for example, affect speech and understanding and cause paralysis," Dr. Whisler says.

"Using computers and stimulation, we can precisely map out the control areas and determine areas of malfunction."

Sometimes the evaluation is complex. In certain cases of epilepsy, for example, it may be necessary to implant electrodes deep in the brain and record the electrical activity for a week or so to determine the precise area responsible for the seizures.

According to Dr. Whisler, "If the malfunction is not in what we call an eloquent, sensitive area, surgical removal can be effective in reducing the number of seizures or completely eliminating them."

When surgical removal is not possible, surgery may still be effective, as in the case of a rare form of epilepsy called Landau-Kleffner syndrome. The technique, developed at Rush, calls for cutting fine grooves along the surface of the brain in a series of rows—like cutting fire lines in a forest fire—to stop the electrical storm of the seizure from spreading.

Another new neurosurgical procedure allows for removal of brain tumors in highly sensitive areas under local anesthesia, with continual monitoring of the brain's electrical activity to pinpoint the eloquent areas that the surgeon needs to avoid. The procedure can be used only in very select cases, Dr. Whisler says, but it does increase the likelihood of surgical removal of such tumors without producing neurological deficit.

Beyond Treatment

At Rush, the focus on patients with neurological problems is now taking a step *beyond* treatment, according to Dr. Fox.

"Neurologic diseases are frequently diseases of aging, particularly Parkinson's and Alzheimer's," Dr. Fox explains. As the aging population increases at an accelerated rate, the intensity of interest and importance of coming up with solutions to problems becomes that much more important.

"We're going to continue to make advances in treatment, but ultimately we will reach a point where treatments don't work. More and more we are going to be dealing with chronic illnesses which take their toll on patients and their families. We have to be activists on behalf of both."

In the Rush Alzheimer's Disease Center, for example, Rush has become involved in all sorts of activities that are very far afield from classical physician involvement—education programs for patient and families, day care for patients, and hospice care for patients. Involvement in long-term care puts a totally different wrinkle on ways that medical centers can contribute to patient care, even when treatments run out.

At the same time efforts continue in research. Four areas of particular interest at Rush are Alzheimer's disease, Parkinson's disease, epilepsy and multiple sclerosis.

As Dr. Fox puts it, "We start out looking at patients and their problems and then develop our programs around that focus."

Alzheimer's Disease: What we know and where we're going

By Carmeline Esposito

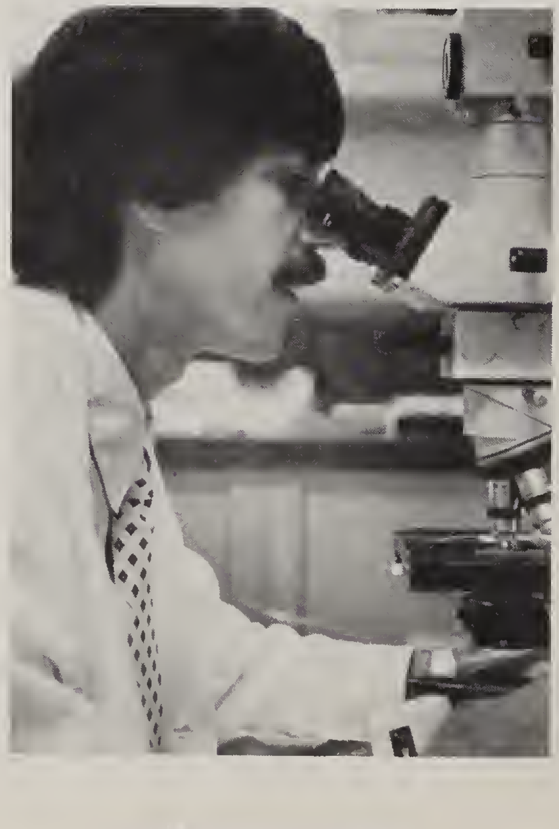
Some amount of forgetfulness is normal as we grow older. However, people 40 years old and older can experience loss of memory which could signify trouble. If, for example, you are driving a car and forget where you are going, or where you left the car, or even what the car keys are for, you could have early onset Alzheimer's disease (AD).

Alzheimer's disease is the third or fourth leading cause of death in this country and over 2.5 million adults are affected. Dementia is most simply defined as the loss of cognitive abilities in an adult. The most common cause of dementia is Alzheimer's disease, characterized by early and, eventual, total loss of memory. "Alzheimer's disease, with another brain-damaging disease, stroke, is the second most common cause of dementia," says David A. Bennett, M.D., clinical director, Rush Alzheimer's Disease Center (RADC), and assistant professor of neurology.

The disease can begin at 40, or thereafter to age 90. Most Alzheimer's patients develop the disease later in life, that is after the age of 65. Men and women are equally affected, although more women seem to develop the disease because of their longer life span.

There is no blood or x-ray test for Alzheimer's disease. "We make a clinical diagnosis based on age (40-90), the presence of memory loss of six months' duration, and the absence of any other disease which could cause dementia," explains Dr. Bennett. A thorough physical examination, he adds, assists in ruling out other medical problems. A definite diagnosis can only be made after death by examining areas of the brain involved in cognitive functions, such as the hippocampus, amydgala and neocortex.

In early stages, the diagnosis of Alzheimer's disease is made by neuropsychological testing. A battery of tests is given at the time of the initial visit to the RADC, and at six-month intervals afterwards, to note and measure the kinds of cognitive problems the patient is experiencing. Attention span, memory loss and the ability to figure out different types of problems are among the cognitive abilities tested. The patient's responses are compared to others his/her own age who are not impaired. Says Bryan Bernard, Ph.D., neuropsychologist on the RADC staff, "With the patients with only mild problems we are trying to establish if the patient's memory problems are greater than those usually experienced by people of the same age."



David A. Bennett, M.D., and colleagues are searching for biological markers of Alzheimer's disease.

There are three stages in the Alzheimer's disease process. In the early stage, there is confusion, a notable loss of memory and sometimes a striking change in personality. This is typically followed by additional memory loss and problems with language. In the final stage, there is complete loss of memory, and judgment so severely impaired that the patient can no longer take care of himself.

Every day at the Rush Alzheimer's Disease Center patients, accompanied by family members, come for diagnosis, treatment and family counseling. Since 1985, when the center opened, over 1,300 Alzheimer's patients have been diagnosed and treated. Today, the center is the largest in the country with 25 new patients a month and 30 patients returning for testing and follow-up. Every patient has a custom-made treatment and care plan designed by the multidisciplinary RADC staff. There are four neurologists on the RADC staff, one geriatric psychiatrist, five nurses, four social workers, four neuropsychologists and a number of technicians.

The center staff is heavily involved in research about the causes, treatment and risk factors for Alzheimer's disease. Patient data is entered into a computerized registry for use in the ongoing medical research. Patients can also participate in controlled studies of new

"Alzheimer's disease, with another brain-damaging disease, stroke, is the second most common cause of dementia."

David A. Bennett, M.D.

Bryan Bernard, Ph.D., tests a patient for indications of Alzheimer's.

drug treatments which attempt to alleviate Alzheimer's symptoms. Currently, there are five drug trials for improving memory. The RADC provides the drug, periodic testing and examinations, plus family counseling at the rate of 60 patient visits per month.

One drug, THA (tacrine or tetrahydroaminoacridine), has received considerable attention in the media since the study began at the center in 1987. THA increases the availability of acetylcholine, a neurotransmitter which is decreased in the brain of Alzheimer's patients.

The drug company producing THA has made application to the FDA and a prescription drug could be forthcoming within a few years. The side effect which temporarily halted the study a few years ago was elevation of liver enzymes. Subsequently, it was learned that THA did no permanent damage to the liver and studies nationwide and at Rush resumed.

In addition to the THA study which has been ongoing for three years, other drugs under study at the RADC to improve memory include nimodipine acetyl-L-carnitine. Pentoxifylline is also being tried for patients in whom strokes are thought to contribute to their dementia. All of.these studies are double-blind, with a certain number of patients receiving a placebo.

"We find that if a drug is going to work (with a patient) it will work overall, or not at all. These drugs are buying us time until more breakthroughs about the disease occur," says Catherine Schneider, M.S., R.N., director of nursing services at the RADC. "One woman on THA after a few months was able to answer the phone again and take messages correctly. She also resumed playing golf."

Another patient in the THA study, Mr. H., came to the center after being diagnosed by the family's neurologist with early AD. "At first it seemed he really wasn't paying attention," his wife said. "Then one evening he was an hour and a half late because he got lost driving home." She also reported an incident where he told her the laundry was "heavy," when he had actually stopped the washer in mid-cycle and put the wet clothes in the dryer.

Mr. H. now says he is doing fine. He is relaxed and friendly and carries on a conversation easily. However, he has been depressed since he resigned his marketing job and his wife, who has a full-time job, says she is looking into home day care for her husband.

Aiding the Caregiver

Helping family members with different care options is their social worker. Every family who comes to the RADC is assigned a social worker upon their first visit to the center During this initial visit, the social worker completes a psychosocial assessment of the family. Three to four weeks after the patient's first visit, when test results are complete, a formal family conference is held. Usually the patient is not present at this conference, although he/she can attend if being there will not be upsetting.

"Families usually tell us that their biggest problem is the uncertainty of the future," says Brigid Brechling, LCSW, ACSW, director of social work and executive director of the RADC hospice program. "We try to re-enforce the fact that the patient with the disease cannot change. So, family members may have to change their attitudes about the behavior and diminishing memory of their loved one. We try to help them accept the illness."

Some families, at the time of the

"These drugs are buying us time until more breakthroughs about the disease occur."

Catherine Schneider, M.S., R.N.

disease's final stage, decide to have home hospice care. The RADC home hospice program began in 1988 and has served 16 patients and family caregivers to date. It is an experimental program which offers trained volunteers to help the patient and family get through the dying process at home.

There are criteria for inclusion in the hospice program, according to Brechling. The prognosis of remaining life should be six months or less. The patient, therefore, is "terminally ill" with no possibility of recovery. A major difficulty is in predicting when the terminally ill condition is, in fact, reached. This is because the range of the disease varies so much, from five to six years of life after diagnosis to 20-plus years.

Charting the Future

What is on the horizon in the next few years for identifying the causes of AD and treating or preventing it? Dr. Bennett explains that researchers from the RADC, together with the departments of neurology and psychology, are looking for biological markers of AD. These markers may be detected in the blood, spinal fluid, brain (through imaging techniques such as the MRI and P-300—electrophysiology similar to an EEG), and skin biopsy. "We're trying to come up with a test for Alzheimer's. This goal is a national and RADC priority. If we can identify biological markers, we'll be able to push forward at a much faster rate," adds Dr. Bennett.

On the treatment horizon, Dr. Bennett is investigating nerve growth factor (NGF), a substance which might be used to prevent the death of cholinergic neurons in the basal forebrain, and perhaps even increase their function. "Rather than replacing a chemical which is missing, NGF appears to have the potential to actually slow down the development of the illness by increasing the growth of certain neurons implicated in the disease," says Dr. Bennett. This has been shown in some animal models.

Dr. Bennett and colleague Jeffrey Kordower, Ph.D., neuroanatomy, are continuing an investigation using a monkey animal model. A recent finding has been encouraging. After transplanting peripheral nerve tissue to the monkey brain, it was noted that new neurons began sprouting. This indicated that the transplanted nerve had an effect on the nerve endings which produce acetylcholine.

When will NGF be available for humans suffering from Alzheimer's? Dr. Bennett believes that may happen in the next few years. "It is definitely going to happen. If not here, somewhere else where scientists are searching for treatment of the disease."

In addition to NGF, there is work in genetics going on as well. "We know that there is most likely a genetic component involved," Dr. Bennett says. "It is widely accepted that there is a genetic abnormality on the 21st chromosone in patients with familial, early onset Alzheimer's disease. But, this is still controversial.

"There is nothing you can do to prevent Alzheimer's disease," Dr. Bennett says. "But I am optimistic that in the next 20 years we will have made significant inroads into learning the causes of the disease and the necessary therapies to give for it. What people can do is to work at preventing other illness such as heart disease and stroke. Prevention is the name of the game."

A family conference at the Rush Alzheimer's Disease Center, led by Brigid Brechling, LCSW, ACSW (right).

"I'm confident if there's going to be a cure for a degenerative neurological illness, it will come first in Parkinson's disease."

Christopher Goetz, M.D.

Parkinson's Disease: Is a cure on the horizon?

By Carolyn Reed

He said his symptoms had a long history, going back at least four or five years, before he became truly concerned.

"I was in an exercise program at work and I began to get toe cramps when I swam. Then the symptoms seemed to move up my legs, so that after about a lap and a half, I'd have to get out of the pool. My legs were so tense I couldn't swim."

Muscle spasm? Tension from job stress? His internist considered those possibilities. But no, Robert Brieschke, at age 61, had Parkinson's disease (PD).

Parkinson's disease is called a "movement disorder" because physical movement is what is first and most obviously affected. Some 400,000 Americans are affected by it. But what causes the difficulties with gait, the cramping, the slowness, the slight tremor in the hand or foot at rest, is actually a neurologic dysfunction: brain cells literally dying off in a specific portion of the brain—the substantia nigra—which controls our ability to move our muscles smoothly. Movement is regulated by the neurotransmitter dopamine, and as cells die off in the region of the substantia nigra, dopamine is no longer produced.

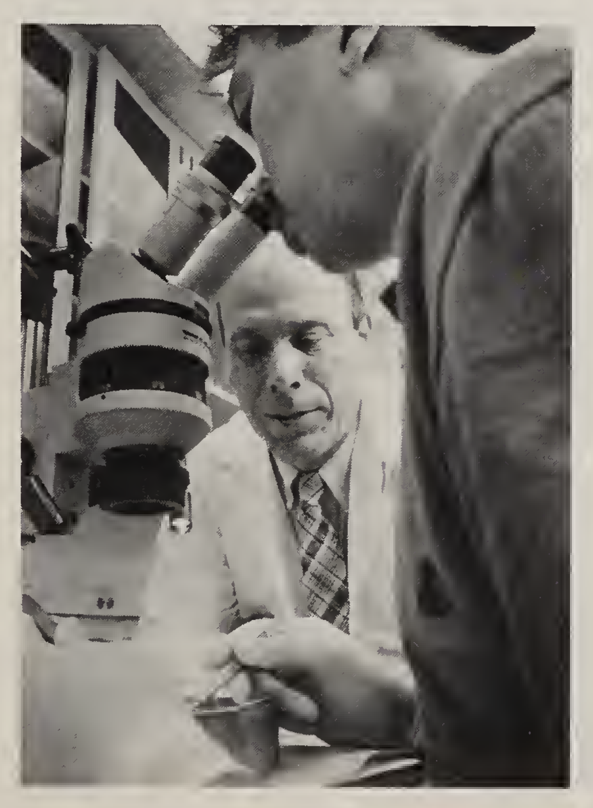
And the tragedy of a disorder like Parkinson's disease is that brain cells, once dead, cannot be regenerated. To date there is no treatment to reverse the progression of PD, nor is the cause of this disease even known.

But substantial strides have been made in the last year to treat this crippling illness. For the first time since the 1960s, when the synthetic form of dopamine—Levodopa or L-dopa—was first used to alleviate PD symptoms, a new medication has come on the scene. This medication appears to slow or halt the disorder's progress. It's called selegiline hydrochloride (Eldepryl or Deprenyl).

"Everything else we've ever studied—and we've tried many things here—does nothing to treat the underlying disease itself," says Harold Klawans, M.D., professor and senior attending physician, Department of Neurological Sciences. "But selegiline may. And that's very exciting."

Dr. Klawans is a senior member of the Movement Disorders Group at Rush, a clinical practice which sees some 1,200 patients annually, many of them Parkinson's disease patients from all over the upper Midwest.

"This treatment is a first for any degenerative brain disease, and is therefore a model for others, like Alzheimer's, amyotrophic lateral sclerosis (Lou Gehrig's disease), the ataxias, a whole host of disorders. It's exciting because it means that there are ways to slow down, maybe halt or even reverse cell death."



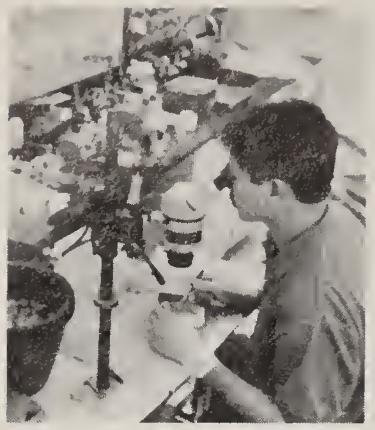
Finding a way to stop the progression of Parkinson's is the aim of research by Paul Carvey, Ph.D. (center).

Robert Brieschke certainly knows what Dr. Klawans is talking about. He was among the first 60 patients at Rush to receive selegiline, as part of a nationwide study. Two years into the study, Brieschke's symptoms remain essentially unchanged.

Brieschke continues to participate in the DATATOP trial. DATATOP stands for Deprenyl and Tocopheral Antioxidative Therapy of Parkinsonism. The rationale behind the use of these two agents is the theory that brain cell death is in some way mediated by an oxidative process. These substances are antioxidative, they halt or slow that process. Exactly how they work isn't known, but then it's not known how or why PD develops in some people and not in others. There are two schools of thought, according to Dr. Klawans.

"It may be an external protoxin which is converted into an active toxin in the body, and this initiates cell death in the brain. Or it may be an inherent process, a natural part of aging, to which some people are more sensitive than others. Inherent in the aging process, toxic substances called free radicals are somehow released and thus cause cell death. We don't really know."

However, neuroscientist Paul Carvey, Ph.D., associate professor of neurological sciences and of



pharmacology, thinks he has some idea about what's going on. He believes that a specific dopamine neuron nerve growth factor plays a significant role in PD. This theory represents a significant break from conventional knowledge about the brain and brain cells. This theory is a direct result of his observations about another experimental treatment: adrenal medulla-to-brain transplantation. This procedure, developed by a neurosurgeon in Mexico City, seemed like a breakthrough treatment when first reported to the scientific community in 1987. The experience of U.S. surgeons—including those at Rush—has not supported the early optimism.

Seven such implants were performed on PD patients at Rush in 1987 and 1988. (Rush maintains the national registry of all adrenal implant patients operated on in the U.S.) The patients continue to be followed, and Dr. Carvey's lab has been conducting the ongoing analysis of their cerebrospinal fluids.

"I never thought it (the transplant) was going to work for the reasons we originally thought it would. Why? Because the operation affected the patients bilaterally. Normally when you operate on one side of a patient's brain, only one side of the body is affected. But in these patients both sides were affected, so I became convinced that a nerve growth factor—a neurotrophic factor—was at work."

Scientists have been aware of neurotrophic factors since the 1950s, but until about five years ago, no one believed they played a role in cell growth or maintenance past the fetal stage. Now some scientists believe that various neurotrophic factors do play an important role in adults, maintaining the function and integrity of the brain.

Dr. Carvey suggests that, unlike a tissue implant, neurotrophic factors can diffuse through and affect the entire brain. As a result of his hypothesis, during the past three years, the work of the Neuropharmacology Research Laboratories at Rush has shifted focus to examine almost exclusively the role of growth factors in degenerative brain disease, specifically PD.

Dr. Carvey and his colleagues, Thomas Lint, Ph.D., associate professor of immunology, and James Kerns, Ph.D., associate professor of anatomy, are using rats as an animal model to test their hypothesis. They're testing various drugs to see if they can influence this neurotrophic factor in rats with parkinsonism. In addition, they're analyzing calves' brains to see if they can isolate the actual substance. Thus far, this work is very encouraging.

"If we could purify this trophic factor, we could administer it to stimulate the growth of remaining dopamine neurons. This growth could stop disease progression," says Dr. Carvey.

"If we could get a diagnostic test for PD, theoretically we could screen patients at age 40 or 45, and identify them early as having a high risk for developing PD. Then we could put them on a drug regimen to increase the trophic factor in their brains. Or, we might administer the trophic factor itself."

In effect, this approach would be a preventive treatment or even a cure for early Parkinson's disease.

What's more, it may be that the drug selegiline is the drug of choice to stimulate the trophic factor in PD patients. But no one knows yet for sure.

"It may turn out that selegiline is the chemical we're looking for," notes Dr. Klawans. "We know it prevents the breakdown of chemicals in the brain, specifically dopamine. Maybe it can also turn things around.

"I think growth factors are the way to go in Parkinson's disease."

People like Brieschke are anxiously awaiting the outcome of this ongoing laboratory research. At Rush, all PD patients now receive selegiline as the treatment of choice for very early PD. "When we give patients selegiline, we don't expect to see improvement, but we do expect their symptoms to plateau," notes Christopher Goetz, M.D., professor and associate attending physician, Department of Neurological Sciences. "And for the most part, that's what we see."

The pills are taken twice a day, at breakfast and at dinner. Patients receiving no other treatment for PD report virtually no side effects from taking selegiline. Whether it or something else works in the long haul remains to be seen. But Brieschke isn't on levodopa yet.

"I feel great, I feel like I'm getting younger," he jokes. Now retired from Kimberly-Clark, he and his wife stay busy decorating and landscaping the home they recently bought in Lake Zurich, and visiting their grandchildren. While he no longer swims regularly, he's taken up golf, a game he used to play when he was younger. And he visits the Medical Center once every three months for a check-up.

"We've never really spoken in terms of cure in neurology," says Dr. Goetz. "But with all that's happening in PD research, I'm confident if there's going to be a cure for a degenerative neurological illness, it will come first in Parkinson's disease."

"Seizures result from 'cross-talk' between nerve centers in the brain which aren't supposed to communicate."

Frank Morrell, M.D.

Epilepsy: New operation curbs 'brain storms'

By Cheryl Janusz

At age three, Erica Organ was affectionate, bright and articulate. "A real chatterbox," recalls her mother, Melinda Organ.

But almost overnight, her family noticed a change in the inquisitive child. She stopped asking questions and avoided eye contact. Normally cheerful and attentive, Erica now seemed angry and couldn't concentrate. Although she could hear, it became clear that Erica was losing the ability to speak and understand words and sounds; even simple sounds such as a car horn and the door bell perplexed her. Eventually, she lost social skills, toiletry skills, the ability to feed herself, and she began to experience seizures—frightening in their frequency and severity.

"It happened so fast, we didn't know how to help her. Everyone was frustrated...myself, the doctors, especially Erica. She became a different child. It was as if the real Erica was trapped in a shell," recalls Organ who, like Erica, is a native of Newfoundland, Canada.

Neurological tests showed a near-continuous epileptic tempest raging in Erica's brain. Ultimately, doctors determined that she had Landau-Kleffner syndrome, a rare form of epilepsy which affects the brain's speech center. Medications offered Erica little benefit and for four years she remained withdrawn, isolated by an inability to concentrate or communicate.

But recently, a unique brain operation available only at Rush has offered Erica hope. Developed by Frank Morrell, M.D., professor and senior attending physician, neurological sciences, and performed by Walter W. Whisler, M.D., Ph.D., professor, senior attending physician and chairman, neurological surgery, the procedure has subdued the storm in Erica's brain, giving her a chance for a normal life.

Epilepsy is characterized by disturbances in the electrical rhythms of the central nervous system. Abnormal electrical impulses manifest themselves in the form of seizures—sudden, brief attacks of altered consciousness, motor activity or sensory phenomena. Landau-Kleffner syndrome is a form of *focal* epilepsy—epilepsy which affects a relatively small area of the brain.

"Seizures result from 'cross-talk' between nerve centers in the brain which aren't supposed to communicate," says Dr. Morrell. "In Landau-Kleffner syndrome, these disturbances interfere with the speech center's ability to process information, causing aphasia—an inability to comprehend or communicate."

When—as in Erica's case—severe focal epilepsy cannot be

Life has changed for the better for epilepsy patient Erica Organ (shown with mother Melinda) following surgery at Presbyterian-St. Luke's Hospital.

TV reporter Mary Ann Childers questions Frank Morrell, M.D., about his innovative epilepsy surgery procedure.

relieved by medication, surgery is the usual option. The operation typically performed for epilepsy, however, involves removing the abnormal brain cells which cause epileptic activity. For Landau-Kleffner patients, this would require removing the part of the brain that is responsible for speech ability.

Dr. Morrell's innovative surgery, "multiple subpial transection" (MST), takes a different approach.

"In Erica's case, rather than removing part of the brain, we performed a selective disconnection of only the horizontal fibers that cross-connect the functionally essential vertical columns. We took great care to preserve the vertical columns from any injury," explains Dr. Morrell.

Right now, Dr. Whisler is the only neurosurgeon in the world who performs this delicate, time-consuming operation. Fine incisions three-sixteenths of an inch deep interrupt the side-to-side connection of nerve cells on the surface of the brain, redirecting the brain's electrical impulses.

"Abnormal impulses in these horizontal circuits can cause epileptic activity, but aren't essential for normal functions such as speech," explains Dr. Morrell. "Therefore, by disconnecting them, we can stop the seizures, leaving speech ability intact. Several days after surgery we can tell whether epileptic activity has subsided. In the following months, we get an idea as to whether the patient can regain speech and understanding."

There's reason to hope for a good outcome. MST has been performed at Rush over 40 times in all, and twice before on children with Erica's condition. Neither child has experienced a seizure since the surgery. Both eventually regained speech.

The procedure was first performed at Rush in 1988 on John Howell of Burnsville, Minnesota, a five-year-old with Landau-Kleffner syndrome. The child has gradually regained the ability to communicate. Today, he bears virtually no sign of his previous disability.

Cameron Rudick, age six, of Montgomery, Alabama, underwent an MST in March of 1989. His mother, Jane Rudick, reports that his recovery has been remarkable.

"Before the surgery, Cameron was lost to us. He didn't understand words or environmental sounds. He behaved autistically—wouldn't sleep or eat much," says Rudick. "It's a terrible situation; you're trapped, your child is trapped. When a child is affected by Landau-Kleffner syndrome, it literally tears a family apart."

Searching desperately for a diagnosis, Cameron's family consulted a multitude of specialists: pediatricians, audiologists, neurologists, even psychologists. Doctors initially attributed Cameron's problem to hearing loss, and he was fitted with a hearing aid. Another doctor, struck by the boy's inability to concentrate and his antisocial behavior, diagnosed him as autistic. Neurologists tested in vain for signs of a stroke, a brain tumor, anything that would explain Cameron's symptoms.

"We were told that we should just learn to *accept* Cameron's condition, that we'd never know what he had, and he would probably never get better," Rudick remembers.

Finally, after a frustrating year of tests, medical bills and misdiagnoses, it was determined that Cameron had a rare form of epilepsy, Landau-Kleffner syndrome. Rudick learned about Dr. Morrell's work through the National Organization of Rare Disorders (NOORD).

"Now, a year after the operation, Cameron is talking up a storm. He's entering first grade this fall, on schedule. In fact, tests show that he's reading at a second grade level," says Rudick. "I truly believe that this surgery gave him back a future."

Recognizing the need for public and physician awareness, Rudick has started an organization called CANDLE (Childhood Aphasia, Neurological Disorders, Landau-Kleffner Syndrome and Epilepsy). CANDLE offers information to parents and professionals, (teachers, special educators, speech therapists, audiologists, and physicians), in the hope that they will refer children who are potentially affected by these disorders to a knowledgeable neurologist for a proper diagnosis.

"Not every child who is aphasic and behaves autistically has Landau-Kleffner syndrome. But for children who have the disorder and have fallen through the cracks, the right diagnosis can insure that they get correct treatment. In some cases, the results can be miraculous," says Rudick.

"Two years ago, doctors were predicting that Cameron would never speak, and that he'd probably end up institutionalized. Today, he's a bright, normal kid who talks incessantly. It's wonderful!"

Although optimistic about the results seen with MST so far, Dr. Morrell is quick to caution that the procedure is not a cure for all forms of epilepsy or for other kinds of speech disturbance not caused by epilepsy. The surgery is considered viable only in cases such as Erica's, where medication offers no help and the traditional surgery would

"Since the surgery (Erica) has been a much happier, more contented child. That's the best change of all."

Melinda Organ, mother of epilepsy patient.

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cause severe deficits.

But in Chicago alone, over 72,000 people have epilepsy, and of this number, over 32,000 cases do not respond to medication. In light of his success with MST, Dr. Morrell hopes that the procedure may be used to help some of the people who suffer from epilepsy that is considered to be untreatable.

And Erica?

Back in Newfoundland, several months after the surgery, her family reports a dramatic change—a return of the friendly, vivacious child they'd known four years earlier. With the tumult in her brain subsided, Erica has an increased attention span, and she is beginning to regain skills that had been lost to her, such as the ability to feed herself. According to her mother, she is even starting to speak.

"For some time now she's seemed to recognize words, and lately she's been saying simple words such as 'Mom' and 'Dad'," says Organ.

"In a way, she's like a baby, learning everything all over again. But she's picking new things up very quickly, and that's a big change. Since the surgery, she's been a much happier, more contented child. That's the best change of all," she concludes.

Multiple Sclerosis: New drug eases crippling

By Barbara Harfmann

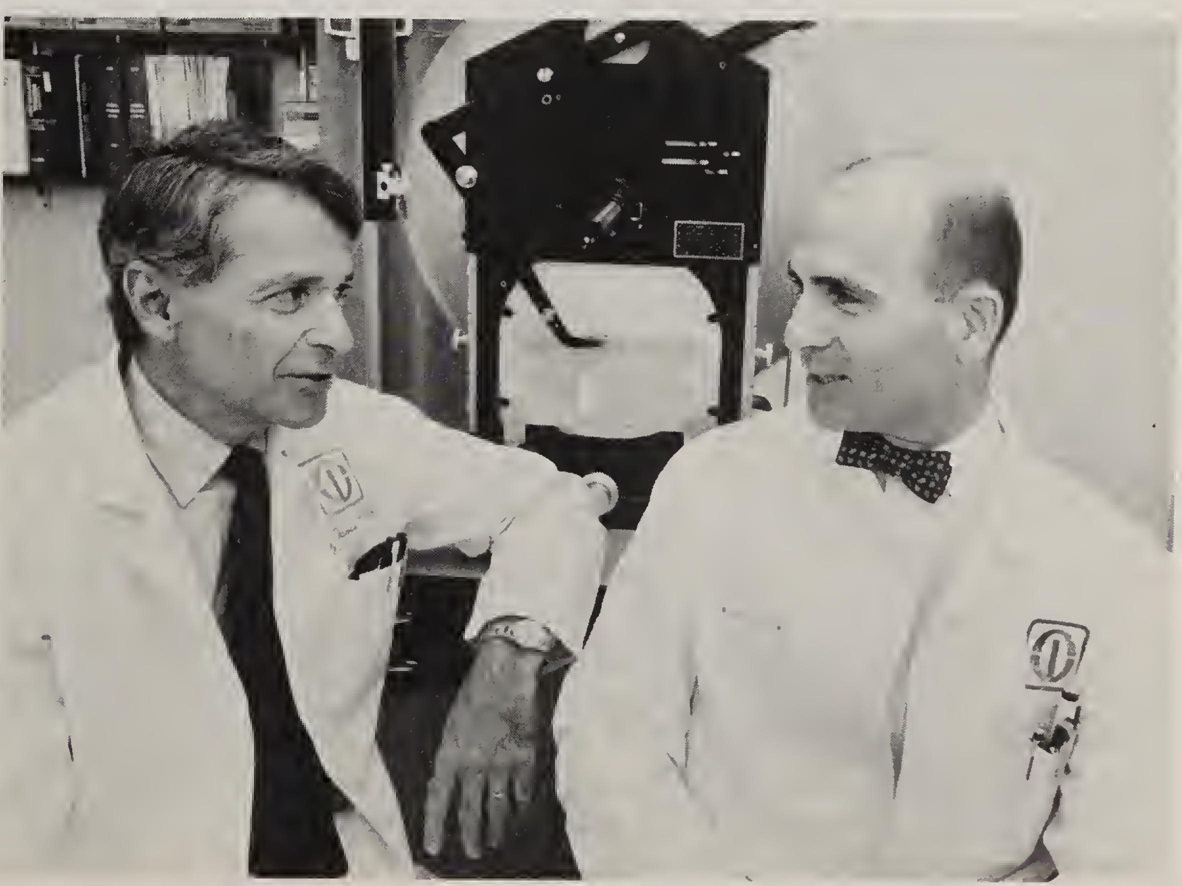
Chicagoan Bruce K. cannot feed himself, comb his hair or scratch his nose without help.

Art Ritrosi, a former supervisor at American Airlines, has difficulty walking and relies on a motorized wheelchair for mobility.

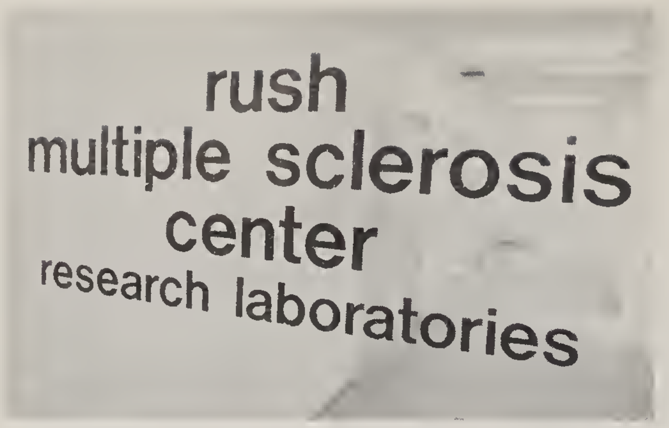
A pharmacist at Cook County Hospital, Arthur Chigas, 38, "runs out of gas" after walking from a car into a restaurant. He occasionally experiences bladder control problems and says that his social life is virtually nonexistent. Even something as simple as handing someone a glass of water now has to be consciously planned and thought out. Natural movements are a thing of the past.

Although their individual symptoms vary, all three are disabled with Multiple Sclerosis (MS), a debilitating, degenerative neurological disease which afflicts about 250,000 Americans, primarily between the ages of 20 and 40. The most common central nervous system disease among young adults in the U.S., MS interferes with the brain's ability to control such functions as seeing, walking or talking. It occurs in mild to severe forms, causing a variety of symptoms such as impaired vision, numbness, paralysis, speech problems, muscle weakness and fatigue.

MS strikes the central nervous system (brain and spinal cord), specifically the insulating nerve covering known as myelin—a fatty substance which aids the flow of nerve impulses. When myelin is



4-aminopyridine researchers: Floyd Davis, M.D., (left) and Dusan Stefoski, M.D.



damaged or destroyed (demyelination), as in the case of MS, these nerve impulses are short-circuited, resulting in a slowing or blocking of transmission along nerve fibers. Movement becomes impaired.

For the past 26 years, Floyd A. Davis, M.D., the Robert C. Borwell professor of neurology and director, Multiple Sclerosis Center at Rush-Presbyterian-St. Luke's Medical Center, has been studying the abnormal impulse conduction process and its effects on MS patients. This work led to the discovery that the drug 4-aminopyridine (4-AP) restores conduction in blocked nerves in MS. Dr. Davis and his colleague Dusan Stefoski, M.D., associate professor of neurological sciences, have been extensively testing 4-AP as a treatment for alleviating symptoms in MS patients.

4-AP restores conduction in demyelinated nerves by slowing or blocking the flow of potassium ions which are concerned with ending the nerve impulse. "The impulse becomes prolonged, which actually generates more energy," Dr. Davis explains. "The impulse is then able to transmit through the diseased nerves."

In 1983 the Rush Multiple Sclerosis Center became the first institution in the country to receive Food and Drug Administration (FDA) approval to test 4-AP on MS patients. (Researchers in England and Japan have also reported efficacy with the MS agent, but Rush was the first in the world to show that the drug improves motor function, such as walking.)

How exactly does 4-AP work? Dr. Davis explains that most MS patients are sensitive to change in body temperature. Elevated temperatures worsen symptoms, whereas a decrease in temperature reduces them. The chemical 4-AP mimics the cooling effect without actually lowering the body temperature—a major breakthrough for the development of a symptomatic MS treatment.

A total of 44 MS patients participated in the studies. The drug was studied in 80 experiments during three clinical trials. "4-AP is effective, when given either intravenously or orally, in improving vision and movement functions in MS patients," says Dr. Stefoski. "Overall, 4-AP worked in 86 percent of the 44 MS patients whose disease is sensitive to temperature change."

In the initial trial, 4-AP was given intravenously. Ten of 12 subjects with MS responded mildly to markedly, with temporary improvements noted in vision and/or strength and coordination which reversed again gradually as the drug wore off over periods of two to four hours. There was no effect with placebo in five patients.

Beginning in 1986, double-blinded studies incorporated the oral administration of 4-AP on a single day (single oral dose study). "The pharmaceutical agent 4-aminopyridine dramatically improved blurred vision and motor function in 15 out of 15 temperature-sensitive males over four to seven hours, while the five who received a placebo showed no change. The drug also did not produce any serious side effects," notes Dr. Stefoski.

In the third trial—the multiple oral dose study—patients received multiple doses of 4-AP over two to five days. Thirteen out of 17 patients improved mildly to markedly with two doses of 4-AP for seven to ten hours, while three out of nine with placebo reported minor benefit.

One patient with severe MS barely able to raise his clenched fists even a few inches became far less rigid and was able to lift his arms over his head with ease for six hours after 4-AP was administered in a single oral dose.

MS patients Arthur Ritrosi and Arthur Chigas are unable to maintain a proper balance while walking, and confess to having little stamina. Multiple sclerosis has robbed them of their balance and strength.

"Somedays I can't lift my left leg because its unresponsive," the 50-year-old Ritrosi says matter-of-factly. Chigas, who experienced his first symptom at age 19 when his eye became paralyzed, has endured MS for half of his life. He maintains his job as a pharmacist at Cook County Hospital but says that it is increasingly difficult to walk. He refuses to use a wheelchair.

For Ritrosi and Chigas, 4-AP offers new hope in alleviating symptoms of a debilitating disease. Both insist that they knew immediately they must have been given 4-AP and not the placebo. "I felt like something heavy was lifted out of me," recalls Chigas. "I felt lighter and walked across the room with greater ease. The stiffness was gone!"

Ritrosi experienced markedly increased strength in his legs and was able to walk across his hospital room heel to toe, heel to toe with vigor and ease—something he had been unable to accomplish in years. He simply says, "I was so happy I felt like crying."

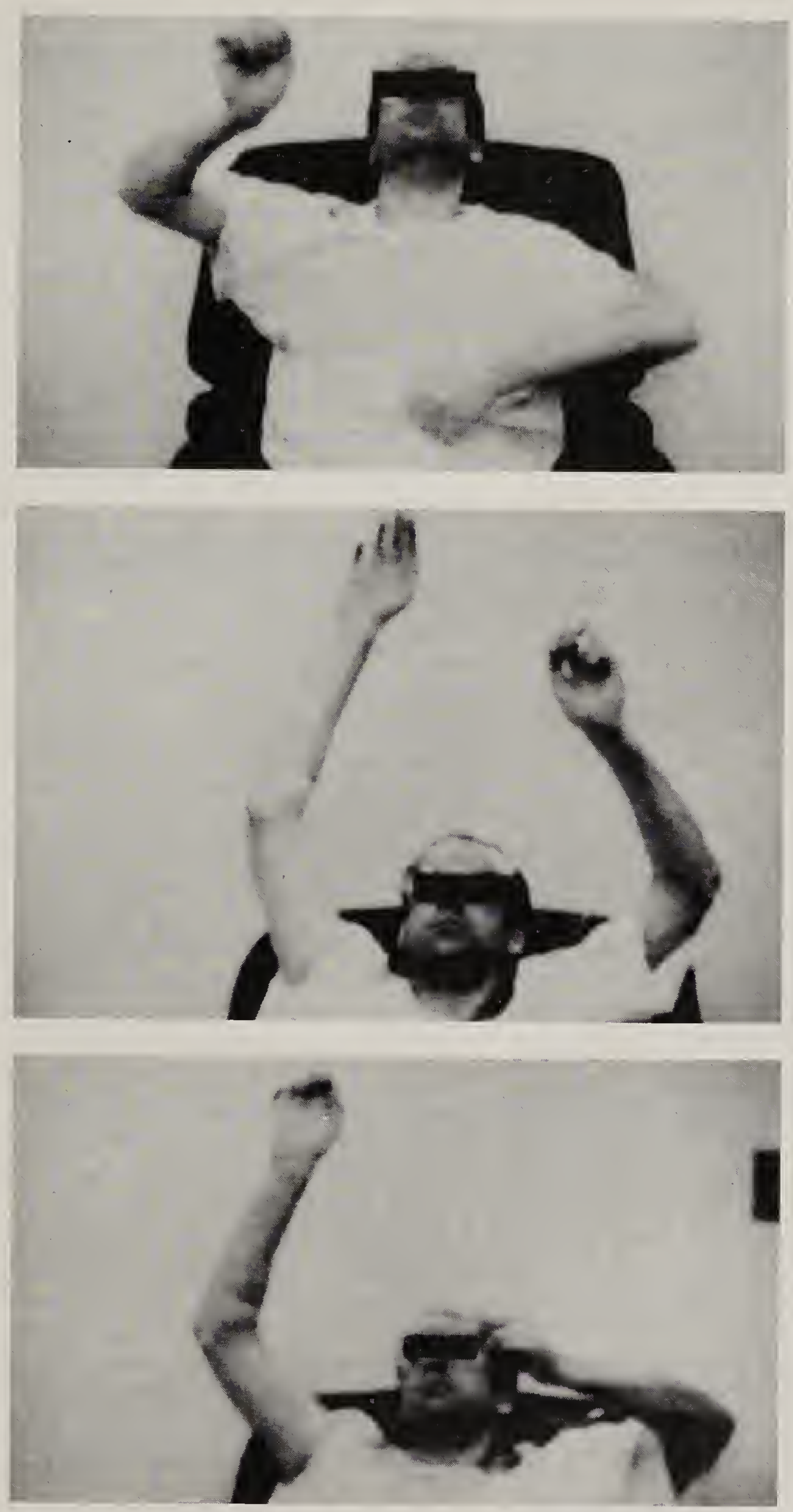
The neurologists caution patients that 4-AP is *not* a cure for MS and cannot slow the progression of the disease. Drs. Davis and Stefoski recently met with FDA officials in Washington, D.C. The FDA agreed that 4-AP appeared to produce a desired positive effect in MS patients.

> *"We hope that 4-AP will at some point be available to provide symptomatic relief to MS patients in order to improve the quality of their lives."*
>
> **Floyd Davis, M.D.**

The next phase of clinical testing involves prolonged multicenter trials which will encompass a larger patient base from Rush and from four or five participating institutions. The plan is to test 4-AP over three to four months to assess possible side effects and to determine whether the drug will continue to improve the patients' symptoms over prolonged periods of time. Before these trials can commence, the FDA requires three months of animal studies to check for possible long-term toxicity. Negotiations with members of pharmaceutical companies are now in progress.

Given FDA requirements, Drs. Davis and Stefoski say its impossible to predict when 4-AP might be available for commercial use. Ordinarily a new drug requires a minimum of 10 to 12 years of testing. "It would be a great thrill for all of us to see patients using this drug at Rush and at other practices throughout the country and the world," says Dr. Davis. "We hope that 4-AP will, at some point, be available to provide symptomatic relief to MS patients in order to improve the quality of their lives."

Nothing would make Ritrosi, Chigas and the thousands of men and women crippled from multiple sclerosis happier. Ritrosi concludes, "I could resume my life where it left off."



Videotape frames show MS patient after 20 mg 4-AP. Top: before 4-AP. Center: 4 hours after 4-AP. Bottom: 6 hours after 4-AP. Improvement is more pronounced in right arm; reversal occurs sooner in more severely affected left arm. Photos used with permission. *Annals of Neurology*, Vol. 27, No. 2, p. 188, February 1990.

The Multiple Sclerosis basic science research is funded by John Ruan Charity Foundation, Inc., through the National Multiple Sclerosis Society and private philanthropy in the city of Chicago. In 1989, the Center received a $7 million endowment from the Joseph and Florence Manaster Foundation to increase services to patients and recruit additional full-time professional staff members. This facility of the Center is to be named the Joseph and Florence Manaster Multiple Sclerosis Outpatient Facility.

Dr. Detective

Physician's books clue readers into neurological mysteries

By Paul Galloway

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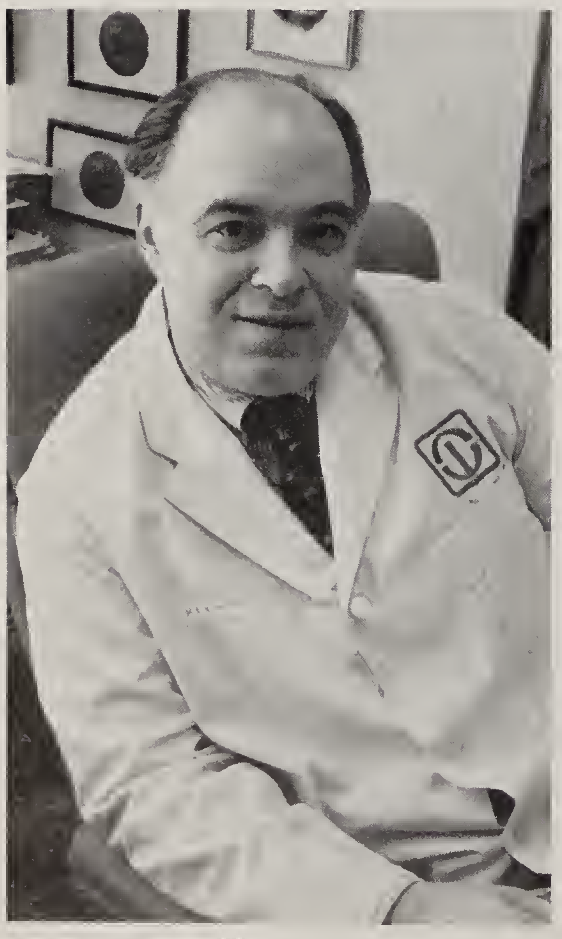


Harold Klawans, M.D.

There was nothing in Jane Porter's early years that foreshadowed the terrible changes that occurred when she was 20.

She was a healthy, happy child and an accomplished student. She could read before starting kindergarten, was valedictorian of her class in high school and earned straight A's in her freshman year in college.

Outside the classroom, her life seemed full and serene. She had caring parents, good friends and a young man she loved and planned to marry.

Then, during her sophomore year in college, everything began to fall apart; it was as though she had become another person. Her performance in class deteriorated, and she failed her mid-term exams; she neglected her friends and pulled away from her fiancé, who talked about calling off the wedding.

What was strange and unsettling was that through all her troubles, Jane Porter smiled. Continually, and for no reason.

She thought she must be going crazy, and the doctors who examined her did not disagree. They decided she suffered from schizophrenia, and one diagnosed hebephrenia, an extremely rare form of this psychiatric disorder. Her parents, however, weren't convinced. They brought their daughter to Dr. Harold Klawans (pronounced Klah-WAHNS), a neurologist who practices at Rush-Presbyterian-St. Luke's Medical Center in Chicago and teaches at Rush Medical College.

When he saw her, Klawans recognized her smile as a symptom of a neurological, not a psychiatric, sickness.

"It was a peculiar smile—not friendly, not joyous, not happy, but there all the while," he noted. "A smile that refused to fade. Closer to a sneer than a smile."

Neurology, he explained, has a Latin name for this condition—*risus sardonicus*, which refers to "a fixed sardonic smile that doesn't go away" and points toward several possible diseases. Which one, of course, was the crucial question.

Klawans writes about Jane Porter and how he identified and treated the malady that caused her curious and revealing smile in "Newton's Madness" (Harper & Row, $17.95), his second book about neurological illnesses.

Most of the book's 22 cases are drawn from the author's own practice, and several feature an intriguing array of prominent figures from the past, including Russian novelist Fyodor Dostoyevsky, Old Testament prophet Elisha, American composer Scott Joplin and Sir Isaac Newton, the great English mathematician and scientist whose two prolonged episodes of abnormal behavior are the subject of the title chapter.

Klawans is a gifted, humane storyteller who has been praised by critics for making compelling to the ordinary reader the analysis of infirmities as complicated and dispiriting as Parkinson's disease, Huntington's chorea, myclonic epilepsy, cluster headaches, Weinicke's encephalopathy and syphilis.

A dominant theme of "Newton's Madness" is the doctor as detective, the skilled observer who meticulously gathers evidence and uses judgment, insight and intuition in tracking and apprehending the source of an affliction or behavioral problem.

A review of "Newton's Madness" in London's Sunday Times called Klawans "the shrewdest medical super-sleuth writing today."

"There are mysteries in all areas of medicine, but traditionally it has been especially true of neurology."

Harold Klawans, M.D.

The gumshoe analogy is particularly fitting, for Klawans, in addition to two nonfiction books, has written three paperback mystery novels—with a doctor as hero.

"One of the aspects that attracted me to neurology was the puzzle solving, the mystery solving, the diagnosis," he said recently. "There are mysteries in all areas of medicine, but traditionally it has been especially true of neurology."

Wearing a starched white coat and leaning back in a swivel chair behind a cluttered desk, Klawans was interviewed in his office, a can of diet root beer at his side.

"When I started in neurology, diagnosis was purely an intellectual exercise," he said. "Even today with all the fancy equipment and diagnostic techniques, between 25 and 35 percent of all neurological diseases must still be established clinically, by observation."

No diagnostic test, Klawans writes, can prove that someone has "chorea or tics or Parkinson's disease or dystonia" or many other other conditions: "The list goes on and on."

Neurologists must rely on the skill of their eyes, especially in studying a patient's movements, which can signal the type of disorder. "Observation begins the moment I see the patient, and I try to do this the first time without the patient's knowledge," Klawans said. "If patients know they're being observed, they'll often try to mask their problems or exaggerate them.

"So I always make a point to leave my office and walk into the waiting room to observe my patients. I may not know which patients are mine, so I observe them all while I pretend I'm reading the newspaper or checking records. Frequently I know a lot of what I'm going to know even before I say hello to the patient."

This approach often bothers patients. "They feel more secure if you order X-rays and CAT scans and EEGs (electroencephalograms) and the full lineup of blood-chemical tests."

'You Don't Treat EEGs'

He's concerned that too many doctors are eager to oblige and are relying on tests and technology at the expense of their patients. "These sophisticated diagnostic techniques become a crutch. We spend less and less time in examining and communicating with our patients and getting to know them and their disease. Doctors need to be reminded that you don't treat EEG's and CAT scans. You treat patients."

Klawans first tried to deliver his message through fiction. "I wanted to write a book about how you teach people the art and skill of diagnosis," he said. "I wrestled with how to do it for four or five months and then it struck me one day—a murder mystery based on a reverse Sherlock Holmes. Sherlock Holmes is based on a physician, so I'll have a physician based on Sherlock Holmes."

Arthur Conan Doyle, a Scottish physician, indeed modeled his legendary English detective on Dr. Joseph Bell, Doyle's mentor in medical school.

Klawans' medical sleuth is a neurologist named Paul Richardson, who, through no coincidence, shares several traits with his creator. Like Klawans, Richardson is now 52, practices at a large teaching hospital in Chicago, worries about his weight and is an avid White Sox fan. (Subtract the last two letters of Richardson, and you have the name of a former Sox player and manager.)

Klawans is a Chicago native, reared on the South Side, a graduate of South Shore High School. He received a bachelor's degree from the University of Michigan and his medical degree from the University of Illinois.

There was no doubt about a career. "I always knew I was going to be a doctor. It's a dominant hereditary disease with 100 percent penetrance," he said. "My father and his brother—the two most important men in my life—were doctors."

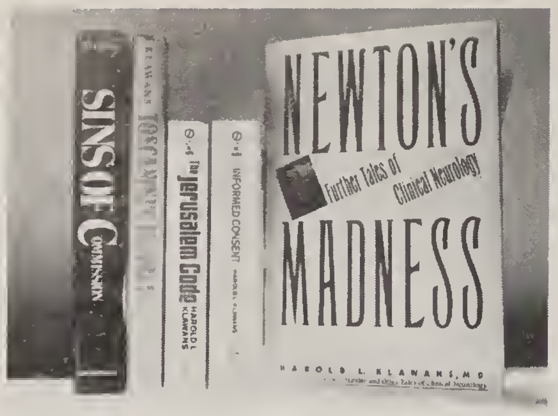
He knew the specialty he preferred from his first year in medical school. "The brain intrigued me. The solution of what happens in the brain when it's not working right and how that allows us to think about the brain when it is working right were two pieces of an endlessly fascinating puzzle."

Klawans has a worldwide reputation for his research on Parkinson's disease and as an authority on Tourette's syndrome and Huntington's chorea. He has written 350 medical articles and edited 55 medical and scientific books.

But those achievements were no help eight years ago when he called a publisher to pitch his idea for "Toscanini's Fumble," his first nonfiction book about neurology. I was told nobody wanted to read about neurology case histories," he said.

Klawans then offered his Dr. Paul Richardson manuscript, which had been gathering dust since 1975, when he'd written most of it while attending an international symposium on Parkinson's disease in Vienna.

"Sins of Commission," published in 1982 by Chicago's Contemporary Books, was followed in 1986 and '88 by two other Paul Richard-



son paperback mysteries, published by Signet Books.

Also in '86, the market for non-fiction books about illnesses of the nervous system suddenly became very hot because of the spectacular and surprising success of "The Man Who Mistook His Wife for a Hat."

This collection of actual case histories written by Dr. Oliver Sacks, a New York neurologist, stayed for months on the best-seller lists, prompting Contemporary Books to reconsider and give the green light to the previously rejected "Toscanini's Fumble."

"Oliver Sacks is the Christopher Columbus of this genre of books," Klawans said. "He opened the field for this kind of writing."

Klawans laughed. "If there's a downside, it's that now I'm expected to be a writer." This adds pressure to a schedule that has few spare hours, and since he's not one of those doctors who take Wednesday afternoons off to play golf, he can't cut back on recreational time.

Remarried in February, Klawans lives in Munster, Ind., with his second wife, Barbara Young Stemer, a professional harpist. "I'm a morning person, and I try to write for a couple of hours before I head for the hospital," he said. "I also try to get in some writing on weekend mornings."

He writes his first drafts in longhand, then rewrites as he transfers the text to his word processor; at each step, music from American musicals or late 20th Century classical music is playing in the background.

"My interests are music, art and theater," he said. "I collect Chicago artists from the 1930s: Tunis Ponsen, William Conger, John Weare. I recently commissioned Weare to paint an oil of old Comiskey Park. It's beautiful. My fantasy is to have one of my plays produced. I've written three or four, and I've been working to get them in shape with the Chicago Dramatists Workshop."

Psychiatric vs. Neurological

A recurring lesson from "Toscanini's Fumble" and "Newton's Madness" is that neurological diseases are sometimes mistaken for psychiatric disorders.

The case of Jane Porter, mentioned at the beginning of this article, and the unbalanced behavior exhibited by Sir Isaac Newton (1642-1727) are two examples.

"Newton's personality changed drastically when he was 35 and again when he was 51," Klawans said. "He was never a terribly social person, but on each occasion he became even more withdrawn and irritable. He accused people of plotting against him, even friends."

"After the second episode, he was never quite the same. All his major scientific work was completed before the second episode."

Some people attributed his change of personality to the death of his mother, depression or the loss of a laboratory to fire. "The answer was mercury poisoning," Klawans said. "He heated metallic mercury for some of his experiments, and this exposed him to very damaging fumes."

The book cites evidence of these experiments and the recent analysis of a lock of Newton's hair by English scientists, who found unusually high concentrations of mercury.

"I think mistaking neurology disease for psychiatric problems happens far less today than it did even 20 years ago," Klawans said. "Today people understand that depression, for example, no matter what triggers it, is associated with a biochemical abnormality and is very frequently hereditary."

In making a diagnosis, Klawans disregards a patient's psychiatric history. "My neurology professor taught me never to take one. All it can do, he said, is mislead you.

"This is because everybody's crazy. All people have strange relationships with their mothers or fathers or brothers or sisters or wives or husbands or children or lovers.

"Being crazy doesn't protect you from disease. And whether or not a patient has a neurological problem is a question to be answered on neurological grounds. You shouldn't prejudice yourself by knowing whether or not there may be psychiatric grounds."

Klawans had merely to look into the eyes of Jane Porter and see the greenish ring around the edge of each cornea to know she was not schizophrenic and that, like Newton, she had a form of metal poisoning.

The culprit was an uncommon hereditary ailment called Wilson's disease that prevented her body from absorbing copper properly.

Because it was detected early enough, the disease could be controlled by medication. Today Jane Porter is a tenured university professor who is married (not to her original fiancé) and the mother of two children.

Exploring Health Problems of the Elderly

An interview with Denis A. Evans, M.D.

By Nancy Stetson

Denis Evans, M.D., started his job only two days ago, and already his conversation is regularly interrupted by a stream of incoming phone calls at the Johnston R. Bowman Health Center for the Elderly. "This will just take a minute," he says, motioning to a visitor to take a seat while he winds up another call. It's early July, and the mid-day sun streams through his window. The office doesn't have that "lived-in" look yet; a few partially unpacked boxes rest on a desk.

As of July, Dr. Evans is the new director of the Center for Research on Health and Aging at Rush-Presbyterian-St. Luke's Medical Center. He is internationally known in his field for his research, particularly his community-based studies. Dr. Evans was previously on staff at the Brigham and Woman's Hospital for the past 15 years and was director of the Alzheimer's Disease Population Registry in East Boston, where he directed groundbreaking research regarding the disease. He was also on the faculty of Harvard Medical School.

Denis A. Evans, M.D., director of the Center for Research on Health and Aging.

Dr. Evans is an internist and an epidemiologist—a scientist who studies the incidence, distribution, and control of diseases among populations. "My interest for the past 10 years has been the problems of older people," he says. "Particularly, these problems as they occur in the community, rather than in some specially selected situation, such as a hospital or institution." He's enthusiastic about his new position here in Chicago and mentions how he looks forward to building a network of scientists, researchers and physicians to make strides in geriatric health research.

"The Center for Research on Health and Aging is going to focus on aging research activity," he explains. The former co-directors of the Center were Thomas Schnitzer, M.D., Ph.D., and Michael Counte, Ph.D. Dr. Schnitzer is the director of Geriatric Medicine, and Dr. Counte is the assistant chairman for Health Systems Management. They were the first to co-direct the Center, which was put into operation a year ago.

Four Areas of Study

"As the incoming director of the Center," says Dr. Evans, "my duties here are to facilitate and accomplish research in aging, in the four areas we've designated."

He lists them: "One is the area of physical function and disability. That's an enormous problem of older people—the inability to do things that are part of daily living. In many ways, how well an older person can perform these everyday activities is a better indication of health than the presence or absence of a particular disease. This is a rapidly developing area. We will make a strong effort here because of the importance of good functioning for keeping people living in their own home in the community, for a longer period of time.

"The second area is Alzheimer's disease." (Dr. Evans, working with a team of researchers in East Boston, recently concluded a study in which they discovered that Alzheimer's disease is much more common in elderly people than formerly realized.) Dr. Evans anticipates that the Center's activities in Alzheimer's disease will be coordinated with those of the Rush Alzheimer's Disease Center, under the direction of Jacob Fox, M.D. The initial efforts will be to try and minimize the effects of the disease in its victims.

"The third area we're going to focus on is infections. That's my subspecialty; I'm clinically trained in infectious diseases... Urinary tract diseases are a big problem of older people. And a fourth area is healthcare delivery to older people. That's an area in which I'll play more of a facilitating role."

According to Dr. Evans, these four areas were chosen because they're deemed the most important in the lives of the elderly. "They're also areas with which I've had some experience and knowledge—with the possible exception of healthcare delivery. I've dealt with them and feel comfortable directing efforts," he says, speaking with enthusiasm about his collaborators. "There's already people on site here at Rush who have strong expertise in these areas as well," he adds, "so there's good collaboration available."

Dr. Evans compares the Center's planned activities to two broad tracks. The primary activity of the Center will be the actual conduct of research. "We will try to obtain funding to do research, we will have faculty who can lead that research, and we will produce, I hope, research results of the highest quality," he says. "And that is the dominant role of the Center.

"The Center's success and impact will be dominantly measured by its ability to do first-class research, to answer fundamental questions such as: what is the prevalence of Alzheimer's disease in the general population? What are risk factors for Alzheimer's? What is the pattern of change in the decline of physical function, and what are the risk factors? What can we do to prevent decline in physical function? What can we do to prevent urinary tract infection in older people? Is it worthwhile to detect urinary tract infection in older people while they're still asymptomatic, and should they be treated then?

"So there's a whole list of questions that we'll break down; finding the answers to those questions is the primary drive of the Center for Research on Health and Aging. And that's what good research is about: it's about answering questions of interest."

In the second track the Center will be a facilitator for aging research in general. "We will do this not only for the faculty within the Center itself, but for others in the Rush community, and in Chicago as a whole. Perhaps we can generate interest among people who have a great deal to offer but are not, at this time, active in the field. Or, put people in contact with other people who share a common interest; they may not be aware of each other's existence at this time. We also want to provide educational opportunities for people who want to learn more about aging."

The Need for Geriatric Research

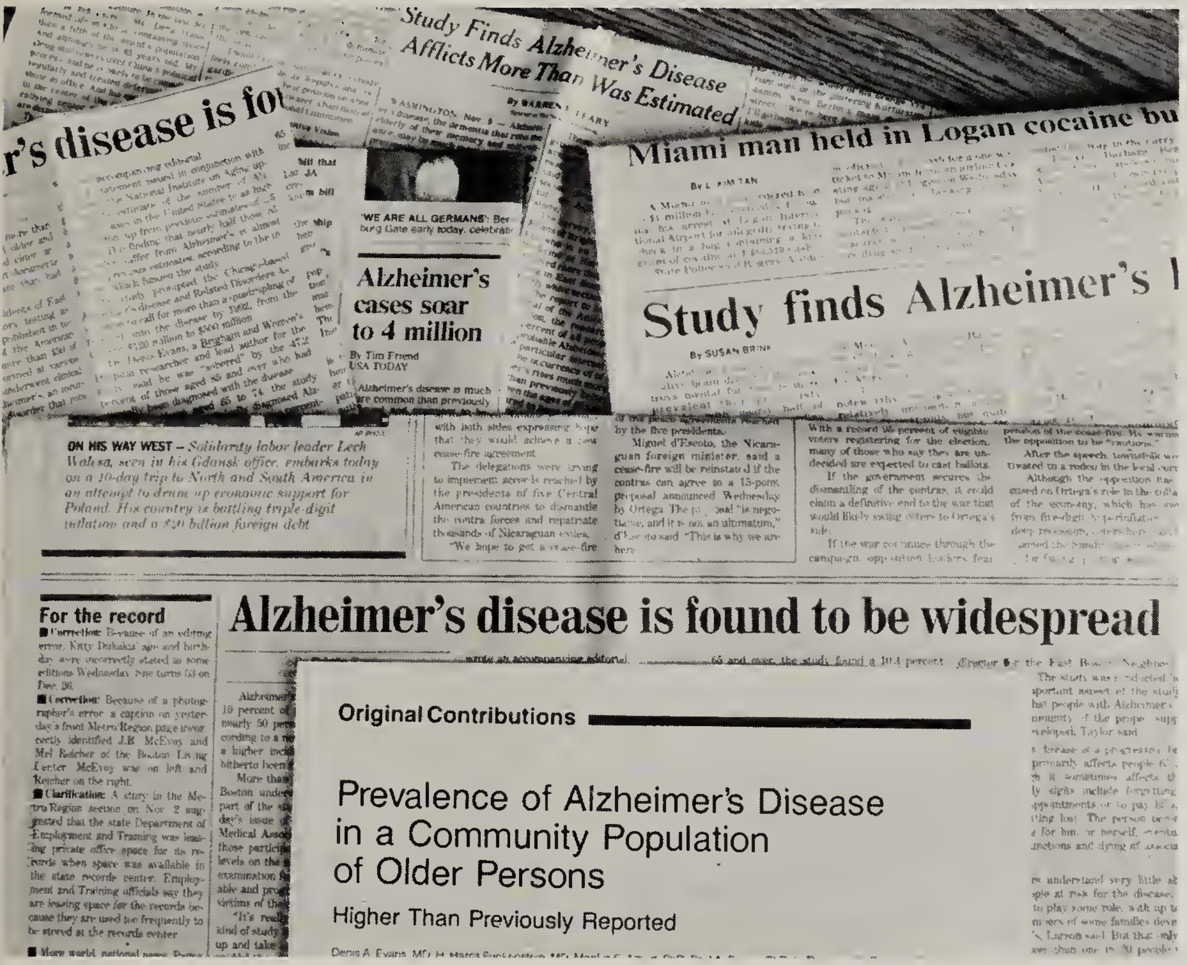
As more of the population grows older, the need for research on aging increases. The oldest of the baby boomers are now middle aged. It is estimated that by 2030, 77 million people—which is one third of the current population in the United States—will be senior citizens. According to the Census Bureau, 10 years from now, four-generation families will be the norm. This combination of a large number of people aging and longer life expectancy explains the urgent need for extended research in aging.

"The growing population of the elderly means that the diseases that increase with age—and that's most of them—are going to become a lot more common. And the adaptations that we make in terms of providing care for those diseases are going to involve reasons that begin to get a little away from my area. They become societal decisions, such as how we will react to this, how much we'll be able to put up with the increasing cost of that care. My realm is to examine what those diseases are, and how they will tend to grow as people get older. I hope we will be able to begin to point out some risk factors for the diseases that are reversible.

"This is a very, very new area, compared to areas such as coronary heart disease, in which we've been doing epidemiologic research for years—60 years or so. We need to identify what the various parts of

"The growing population of the elderly means that the diseases that increase with age...are going to become a lot more common."

Denis A. Evans, M.D.



Study Finds Alzheimer's Disease Afflicts More Than Was Estimated

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Miami man held in Logan cocaine bu

'WE ARE ALL GERMANS': Berlin Gate early today, celebrat

Alzheimer's cases soar to 4 million

By Tim Friend USA TODAY

Study finds Alzheimer's

By SUSAN BRINK

ON HIS WAY WEST – *Solidarity labor leader Lech Walesa, seen in his Gdansk office, embarks today on a 10-day trip to North and South America in an attempt to drum up economic support for Poland. His country is battling triple digit inflation and a $40 billion foreign debt*

For the record

Alzheimer's disease is found to be widespread

Original Contributions

Prevalence of Alzheimer's Disease in a Community Population of Older Persons

Higher Than Previously Reported

Montage of articles on Dr. Evans' Alzheimer's research project, following publication of results in the *Journal of the American Medical Association* (shown in foreground).

the diseases are, the risk factors, and then do something about them.

"I was trained in infectious diseases and went to East Boston to investigate a particular problem of the aging, with no intent at that time that I would get interested in community-based research at all. But what happened was, I became extraordinarily interested in the methods and potential of doing research in a community. Those of us who were doing research then made a very conscious decision to work on the problems of older people."

He goes on to explain that even though communities may have thousands of people, "rare diseases *are* pretty rare, and you won't find many—if any—to study in a community. So, you study common things. Also, if you look at the burden of chronic common diseases in a community, a lot of times it's older people who are affected. This was the cornerstone of my decision. It's where the action was, and is." He also realized that the government recognized the need for study in this area and was more likely to provide funding.

Alzheimer's More Prevalent

Dr. Evans and his Boston team recently completed a major study on the prevalence of Alzheimer's disease. When they surveyed residents, the team discovered that in those 65 to 74 years old, 10.3 percent had Alzheimer's; in those 75 to 84 years old, 18.7 percent; and for those 85 and older, 47.2 percent—almost half. These statistics were so significant and so radically different than previous ones, that the National Institute on Aging increased its estimate of people in the United States with Alzheimer's disease from 2.5 million to four million.

"You have to realize that these are people in a community population, as opposed to a hospital," says Dr. Evans, "so you're seeing mild, earlier forms of the disease. Everyone could function in the community, by definition. Those with Alzheimer's were living at home; the disease was not that far along."

A door-to-door census was initially taken to establish an eligible population to participate in the studies. Of the 4,800 senior citizens living in the East Boston community, 3,809 participated, which is considered a very high response rate. Specially trained interviewers returned to those willing to participate and asked them an extensive list of questions about medical and social problems common to older people. The interview included measuring blood pressure and pulmonary function. The participants were asked to grant access to their medical records.

"The interviews also included a very brief performance test of cognitive function; we tested it in a very rough, crude way," says Dr. Evans. "We would tell the people a brief story; it was three sentences long, and each sentence contained two ideas. The story was about a fireman rescuing some children from a fire. The story was specifically designed to be a common situation; it's interesting, and it's not aimed at any particular group—it's

"The statistics mean that if you pick anybody over the age of 85, your chances are almost half that they will have Alzheimer's."

Denis A. Evans, M.D.

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universal. Immediately after we told the story, we'd say, 'can you tell me what you remember of the story I just told you.' And they were graded according to the number of the six ideas they were able to recall. Someone who recalled all six ideas would do well; if someone couldn't remember, they'd be graded poorly.

"Then after a distracting task that lasted about two minutes, we'd ask them again to tell us what they could remember of the story. In this way, we measured immediate and delayed verbal recall. We also had others ways of testing cognitive function, but the memory story was extremely useful.

"On the basis of that test, we invited a select group of people—about 500 of them—to undergo more detailed clinical evaluation. They were deliberately selected to represent the community population, a stratified, specified sample. They represented both people who did poorly on the test and those who did well. Based on the 467 people who underwent this detailed, clinical evaluation, we were able to calculate the number of people in the community who actually had Alzheimer's disease."

Dr. Evans and his team wrote a report on their findings which was printed in the *Journal of the American Medical Association* (JAMA). This report was picked up by the national press, and articles about the findings ran in newspapers such as *The Wall Street Journal* and *The New York Times*.

"The statistics for those 85 and over are quite sobering," says Dr. Evans, "especially when you consider that it's the fastest-growing age group in the United States now. The statistics mean that if you pick anybody over the age of 85, your chances are almost half that they will have Alzheimer's. The risk gets higher as they age. It's probably even higher for those over 90, but we don't really know that, because not many people live to be over 90 years old.

"So what are we going to do? My role, as an epidemiologist who considers the diseases of older people, is predominantly in preventing disease. That's eventually what we want to do through our research. Right now, that seems a long way off for Alzheimer's. People don't know the cause of it, so prevention is a distant prospect at this time. But finding the causes is not far-fetched and we have to give it high priority.

"So from my perspective, the single most important thing in the epidemiological research of Alzheimer's is to identify factors which predispose the disease, which are potentially reversible. That is something I'm actively doing with my contacts—with the collaborators that I left behind in Boston, and now with new ones here in the Chicago area at Rush."

Nursing Research

At the bedside and in the lab

By Cheryl Janusz

A five-year-old cancer patient experiences unrelenting pain. Can simple, non-pharmacologic interventions diminish her discomfort?

A bedridden Alzheimer's patient, not cognizant of the need to shift his weight, develops pressure sores. How do his caregivers effectively prevent their recurrence?

A young mother, exhausted by the demands of raising a family, is anxious and depressed. Will her turmoil have an impact on her children and, if so, can health care workers circumvent this effect?

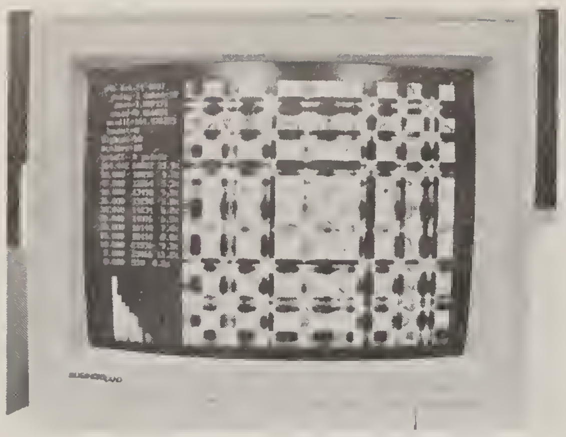
In the day-to-day care of patients, these and other crucial questions arise constantly. Nurse researchers at Rush are searching for answers.

As we approach the twenty-first century, our view of nursing is gradually changing. The profession has become a "science" in the traditional sense. Today, research—the testing of theory and practice through a systematic, scientific process—is an integral part of nursing.

Many of us associate "scientific research" with test tubes and mathematical equations—a world that seems far removed from the patient's bedside. But, according to Kathleen G. Andreoli, D.S.N., dean of the Rush College of Nursing and vice president, nursing affairs, science and patient care are not only compatible; in the context of nursing research, they're inextricably connected.

"Science *directs* patient care. We can't make changes in the way nurses deliver care based on folk-

The team approach to AIDS research: Janice M. Zeller, Ph.D., R.N., (left) with fellow researchers Nuannoi Rattan, Ph.D., R.N., and Barbara Swanson, M.S.N.



lore or whims. If clinical interventions are to be effective, we have to base them on accurate, tested information," says Dr. Andreoli.

"We talk about nursing being both an art and a science. Caregiving is the art; measuring the effectiveness of caregiving through research is the science," she says.

The concept of nursing as a science extends back to Florence Nightingale who, in her classic *Notes on Nursing*, stressed the importance of observation in the delivery of patient care. This preference for systematic study over a "trial-and-error" approach to patient care is at the core of most research today.

Unfortunately, despite its history, research remains the aspect of nursing that is least understood by the public.

"Even today, the public tends to view a nurses' whole job as giving shots, carrying bedpans and doing what the doctor tells them," says Dr. Andreoli. "There is little appreciation for the fact that nurses can be scientists, and that they can drive their own practice through research."

It's only recently that nursing research has been officially recognized in terms of government funding. In 1986, the National Institutes of Health (NIH) authorized the National Center for Nursing Research (NCNR). Through NIH, NCNR conducts a program of grants and awards supporting basic and applied nursing research and research training. The center's significance is two-fold: It provides a new, much-needed avenue of funding, and it places nursing on an equal footing with other scientific disciplines.

"Nursing research is still something of an evolving field," says Ann M. Minnick, Ph.D., R.N., associate professor and director, Office of Nursing Services Research and Support, "but we're heading in the right direction. We're seeing increasingly sophisticated study designs, and, most importantly, more nurses are becoming doctorally prepared, getting the educational credentials for a research career."

Nursing Research at Rush

Under the leadership of longtime dean and vice president Luther Christman, Ph.D., R.N., now emeritus, the Rush College of Nursing achieved a national reputation for its innovative "unification model" of nursing education and practice. Today, this model continues to unite education, practice and research under one roof; professors, quite literally, practice what they preach. Does the model work? Statistics speak for themselves: Of the nation's 2.1 million nurses, only 7.3 percent are prepared at the master's or doctoral level. Of Rush's 1,772 nurses, 298—or 16.82 percent—have a master's or doctorate degree, giving Rush an impressively large proportion of nurses with graduate preparation. Furthermore, the Rush name consistently appears on lists of the top 10-15 Colleges of Nursing in the U.S.

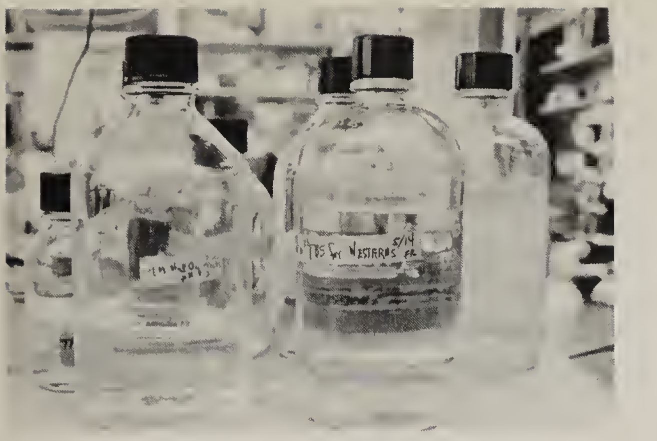
According to Dr. Andreoli, these factors provide a fertile environment for research. "You can't have these resources and not have a responsibility to create and test new knowledge," she says.

As Dr. Christman's successor, Dr. Andreoli maintains a firm commitment to education and research. Under her direction, research has been "decentralized." There is no longer a central "research department;" rather, each of the six departments of nursing (medicine, surgery, maternal/child, community, psychiatric and gerontology) is involved in scientific investigation. There are over 40 doctorally prepared nurses on staff at Rush who direct or are involved in research projects along with nurses with master's and baccalaureate preparation.

Since 1987, the Office of Nursing Services Research and Support has served as a conduit for information and assistance. Directed by Dr. Minnick, the office provides myriad invaluable services to researchers, from notifying faculty of grant opportunities to helping with the typing and processing of grant applications, and administering resource funds to new investigators.

With this structure in place, nursing research at Rush has flourished. "I would say that research productivity at Rush has quadrupled in the last three years," says Dr. Andreoli, "but we still have many challenges to meet. Like other research disciplines—perhaps to an even greater extent—we're competing for dollars. If we want to continue to increase our research productivity, we have to look for solid research studies that are *fundable*."

And what is fundable? AIDS and the immune system, Alzheimer's disease, clinical evaluation of pressure sores, immobility, nutrition, stress, pain management, care of the elderly, and issues facing patients' families—these are just some of the problems that will inevitably affect us, or someone we know. As Mildred G. Kemp, Ph.D., R.N., associate professor, OR/surgical nursing, says: "It's important to communicate the clinical relevancy of our research. We're more likely to get funding if people believe that their money is going to



Using an unusual computer program, Joseph P. Zbilut, Ph.D., D.N.Sc., R.N., is able to identify elusive patterns in cardiac rhythms.

provide clear results at the bedside."

Although nurses use traditional scientific methods, Rush nursing research, as a rule, maintains a firm relationship with practical, clinical application.

"The link between nursing research and patient care, while not exclusive to nurses, is a very clear one," says Dr. Minnick. "Nurses are the only group who spend 24-hours-a-day with a patient throughout the entire course of an illness. They have a knowledge of the patient situation that is unique."

Dr. Andreoli agrees, adding that "medical studies tend to be more disease-oriented than nursing studies. We have what we call a 'sick-well continuum,' which encompasses the patients who are well up to the patients who are sick. Nursing research covers that entire continuum."

Reflecting this diversity, Rush nurse researchers are exploring all aspects of patient care delivery related to health as well as illness. Three broad areas of research have been defined: Physiological Responses in Health and Illness, Behavioral and Psychological Responses in Health and Illness, and Health Care Services Research.

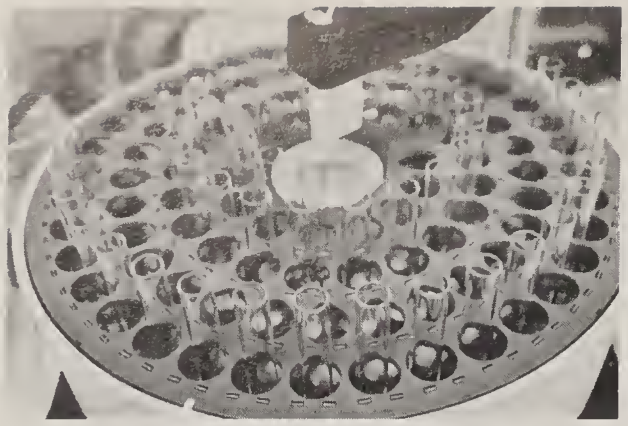
Physiological Responses in Health and Illness

In his work, nurse-physiologist Joseph P. Zbilut, Ph.D., D.N.Sc., R.N., looks for subtle patterns in cardiac and respiratory rhythms, a search which rarely takes him away from his computer. Probing the secrets of the immune system, nurse immunologist Janice M. Zeller, Ph.D., R.N., spends much of her time focusing on the laboratory evaluation of white blood cells. What does this type of study have to do with patient care? "Plenty," says Dr. Zeller, professor, medical nursing and associate professor, immunology/microbiology. "From a nurse's perspective, it's important to know how the body responds to physical insults such as infection or tumor growth. The study of physiological responses lays the foundation for future clinical studies and interventions."

Dr. Zeller, who has a doctorate in physiology and postdoctoral training in immunology, is currently involved in several research projects, including basic science studies of white blood cell function. The ultimate goal of her work: to find more effective ways to fight infection.

Dr. Zeller is also looking at the role that stress plays in the progression of AIDS and HIV infection. In conjunction with Nuannoi F. Rattan, Ph.D., R.N., a postdoctoral fellow with the College of Nursing and Gregory Spear, Ph.D., assistant professor, immunology/microbiology, she is investigating whether stress hormones affect HIV's ability to infect white blood cells.

"Nursing research takes a dual perspective, looking at the relationship between a patient's psychological state and physical well-being," says Dr. Zeller.



Stress, she continues, is a psychological factor that has been shown to influence the immune system, making us more susceptible to illnesses that affect our physical health. "This may be especially important for nurses who deal with AIDS patients, for if we can discover a tie between HIV infection and stress, this could lead to intervention strategies. Perhaps something as simple as teaching patients coping techniques could slow disease progression," Dr. Zeller theorizes.

Another project, conducted by Joyce K. Keithley, D.N.Sc., R.N., along with Dr. Zeller, Debra J. Szeluga, Ph.D., R.D., and Pamela Urbanski, M.S.N., R.N., concerns the relationship between nutrition and immune system response at six stages of HIV infection—stage 5 being patients with full-blown AIDS and stage 0 being people, not yet infected, who engage in high-risk behaviors. Each investigator brings diverse skills to the study: Dr. Keithley has a background in clinical nutrition; Dr. Zeller, immunology; Dr. Szeluga is a registered dietitian; and Urbanski's speciality is infectious disease. Together, they hope to find a link between nutrition and immune system response that will lead to interventions which could slow the progression of HIV.

"Interdisciplinary studies are an important trend," says Dr. Keithley, associate professor and chairperson, OR/surgical nursing. "In terms of funding, private and federal agencies tend to look favorably on projects that are 'well-rounded' in nature."

Dr. Zbilut, associate professor, OR/surgical nursing and physiology, takes a uniquely interdisciplinary approach, practicing a brand of research that combines nursing, medicine, mathematics and physics. He applies "non-linear dynamics" to the treatment of certain heart and respiratory problems.

"Non-linear" is a physics term used to describe phenomena that do not follow a visible, recognizable pattern, explains Dr. Zbilut. In nature, this could apply to any natural, seemingly-chaotic phenomenon; the way a tree branches, for example. For Dr. Zbilut's purposes, "non-linear" describes heart rate, breathing patterns and other physiological responses that are not—at least by analytical systems currently used—considered to be predictable.

"What researchers in all scientific disciplines are finding, however, is that what appears to be random is, in fact, very deterministic," says Dr. Zbilut. "The way we typically analyze a patient's heart rate makes the data look meaningless, but, when it's analyzed another way, we see discrete patterns."

He suspects that there are universal patterns in cardiac rhythms that precede problems such as congestive heart failure. If these patterns can be identified, they might provide nurses with a way to predict life-threatening events before they occur and control them once they start.

"Intervention has to occur at the bedside. Nurses see patients on a near-continuous basis and, as a result, they have access to data that isn't available to other professionals. They have the best opportunity to observe patterns and predict problems," says Dr. Zbilut.

Some physiological studies have visible ties with patient care; for example, Dr. Kemp's study of pressure sores. By looking at physical and behavioral factors that contribute to skin-breakdown, Dr. Kemp believes it is possible for nurses to identify individuals who are at risk for developing pressure sores. Prevention and intervention can then be based on accurate, objective clinical profiles, rather than trial-and-error.

"The purpose of research is to remove uncertainty; to establish better, cost-effective interventions with predictable outcomes, and to learn how to prevent problems from occurring," Dr. Kemp says, adding: "It's better to prevent a pressure sore than to cure one."

Behavioral and Psychological Responses in Health and Illness

Most nurses agree that the mind interfaces with the body; factors such as pain, stress and depression, common side-effects of illness, can have detrimental effects on health. "In providing round-the-clock care, it's inevitable that nurses will face behavioral and psychological issues. Often, dealing with them is as important as treating the physiological symptoms of disease," says Dr. Minnick.

For nearly ten years, Marion E. Broome, Ph.D., R.N., associate professor and assistant chairperson, maternal/child nursing, has investigated the little understood area of pain management in pediatric oncology patients. Most recently, Dr. Broome has been studying the role of parent/child interaction and looking at non-pharmacologic interventions such as breathing techniques to see how effectively they reduce a child's distress.

"The treatment of pediatric oncology involves lumbar-punctures, bone marrow aspirations and other acutely painful procedures," she says. "With most children, anything you do to distract or prepare them

"Science directs patient care. We can't make changes in the way nurses deliver care based on folklore or whims."

Kathleen G. Andreoli, D.S.N.

helps diminish pain and reduce stress. Now, our goal is to find ways to help children for whom traditional interventions don't work."

As the nation's geriatric population grows in number, care of the elderly is becoming increasingly important. In Alzheimer's disease (AD) research that has received national acclaim, Carol J. Farran, D.N.Sc., R.N., associate professor and director of psychosocial research programs with the Rush Alzheimer's Disease Center, has examined the caregiver's role. From her findings, Dr. Farran and her research team have devised an eight-week program designed to help caregivers cope with their situation. It emphasizes knowledge about AD and the disease process, physical aspects of caregiving, self-care, community services, and financial and legal planning.

After five years of study funded by a grant from the Alzheimer's Disease and Related Disorders Association, Inc., Dr. Farran comments, "we've been studying this subject for five years, and we feel that we're just scratching the surface."

Another five-year award is enabling Deborah Gross, D.N.Sc., R.N., associate professor and practitioner/teacher, psychiatric nursing, to conduct a comprehensive study of maternal confidence and its effects on toddlers. Granted by the NIH, the prestigious First Independent Research Support and Transition (FIRST) award helps new investigators get started on promising research projects.

One year into the study, Dr. Gross has observed a surprisingly high rate of depression among middle-class mothers. "The stresses these women face are incredible," says Dr. Gross. "Financial problems, time constraints, marital difficulties—all of these factors affect a mother's confidence; her problems, in turn, affect her children. It's difficult to raise children when you can barely make ends meet."

In the final two years of the study, Dr. Gross will develop and test interventions designed to help nurses identify and educate mothers who need assistance with parenting. She believes that showing mothers how their behaviors affect their young children could be a simple, effective way for nurses to offer support.

In her study of the relationship between nutrition and immune system response, Joyce K. Keithley, D.N.Sc., R.N., monitors patients' weight and diet.

Health Care Services Research

As care delivery becomes increasingly sophisticated, the questions facing nursing administrators, educators and researchers also grow more complex: How should care delivery systems be organized? How many people are needed to implement care? What kind of support systems are needed? How much will all of this cost?

"This field of research, although not always recogized, is gaining more and more importance," says Dr. Minnick. "It involves the study of *how* care is given versus *what* care is given."

"More and more hospitals are required to supply data to justify decisions related to care delivery and costs," adds Janet Scherubel, Ph.D., R.N., CCRN, associate professor and assistant to the director, Office of Nursing Services Research and Support. "It's important for a health care institution today to know its identity; to be aware of what care is provided, and how it's accomplished. Health services research provides valuable information towards this end."

Along with Dr. Andreoli, Dr. Minnick is researching strategies to enhance nursing retention and recruitment at Rush. Dr. Minnick has also been funded to study retention issues on a national basis. Health service research topics under investigation by other Rush nurses include the relationship between quality of nursing care and customer satisfaction, the impact of dress codes on the image of nurses, the effects of staffing levels on patient outcomes following surgery, and a demographic comparison of nurses' use of humor in their work.

"These types of studies involve a 'systems' approach as opposed to a

> *"The purpose of research is to remove uncertainty; to establish better, cost-effective interventions with predictable outcomes and to learn how to prevent problems from occurring."*
>
> Mildred G. Kemp, Ph.D., R.N.

clinical, patient problem-centered approach. The value of this research, however, is still patient-centered. Outcomes directly affect patient care," says Dr. Scherubel.

For example, Dr. Scherubel is involved in an examination of "microcosting" on the medical intensive care unit. In this study, the costs of nursing care activities on the MICU will be correlated to length of stay, acuity and other factors relevant to MICU patient care delivery. In other research, she is conducting a work-sampling study of nursing activities on patient units in an attempt to discover how nurses utilize their time.

The Future

Computers, equipment, and lab space are resources vital to quality research. Unfortunately, they are also expensive and, as Dr. Zeller points out, "it's often difficult for an institution to justify spending large sums of money on research when teaching and clinical demands have to be met first."

Finding well-qualified individuals to *do* research is also a challenge. Unlike other scientific disciplines, nursing has not been as involved in graduate-level research training.

"In other disciplines, psychology for example, students obtain a doctorate before they practice," says Dr. Gross. "Because of the nursing shortage, however, nurses are needed on patient units. There's pressure for nurses to practice as soon as possible, often at the expense of advanced education."

This trend is evident in the statistics: Few nurses obtain master's degrees, and even fewer doctorates. Most nurses who do go on for a doctorate do it later in life, when they may have a family and other pressing financial obligations. "At this point, choosing a research career requires a real financial sacrifice," says Dr. Zeller.

Recognizing this, the NCNR has established fellowships for nurses who want to return to school for a doctorate after years of clinical practice and to assist nurse faculty who already hold doctoral degrees to develop an independent program of research.

Problems such as inadequate funding and research training are road-blocks to scientific discovery, but, as Rush nurse researchers point out, they are far from insurmountable.

"We have challenges to meet, but, despite these, nursing research is growing by leaps and bounds. There are more and more people prepared to conduct research, and there's more diversity in the research that is being conducted. This diversity is especially apparent here at Rush," says Dr. Scherubel.

As nurses seek the most effective ways to care for patients, the bond between the bedside and the laboratory will continue to be an important one. Dr. Kemp observes: "Nurses may not be finding a cure for cancer or AIDS, but we are *caring* for people who have these illnesses while they wait for a cure to be found. If we can deliver care that is grounded in research findings, we can improve the quality of patients' day-to-day existence—and helping patients is our ultimate goal."

Beyond the Books

Students apply learning in the community

By Justine Ringhofer

In the past two years, students at Rush University have implemented community service programs with a twofold purpose—to learn and to apply their knowledge by providing voluntary and consistent care to people from different economic and life situations—and to reciprocate the trust, loyalty and satisfaction of those they serve.

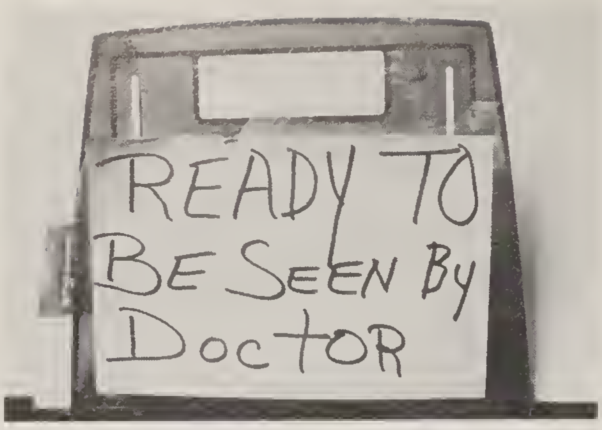
Rush Medical College

St. Basil's Free Clinic, located in the rectory of a magnificent, old, Byzantine church on Chicago's southwest side, houses the Rush Primary Care Clinics Project (PCCP). It is the primary source of health care for the mostly black and Hispanic, poor-to-low-income community nearby. As many as 90 Rush medical students volunteer at least one day a month at the clinic, as do nearly 30 Rush physicians who, together with students, treat medical conditions ranging from high blood pressure and diabetes to amputated limbs.

"I think the clinic represents an expression on the students' part of the need for more ambulatory care experience," said James A. Schoenberger, M.D., chairman of preventive medicine at Rush University and The Charles J. and Margaret Roberts Professor of Preventive Medicine. "In my day, outpatient, ambulatory care was a large part of medical education—now it is almost nonexistent."

Dr. Schoenberger gave credit for the success of the clinic to "a few students who were marvelous leaders and organizers."

John Wlodarski, M4, checks young patient as Pediatrician Mark Ward, M.D., looks on.



One-year-old Gloria shows her displeasure as Douglas French, second year medical student, pricks her finger for a blood sample. Dr. Mark Ward observes procedure.

One year ago, a group of second-year medical students approached Edward Eckenfels, assistant dean and associate professor of preventive medicine, and asked where they could find a community-based primary and ambulatory care setting that would continue to fulfill the satisfaction they had experienced in the community health course he teaches. Eckenfels sent them to Peter DeGolia, then a fourth-year medical student who had volunteered at the St. Basil's Free Clinic throughout his four years at Rush.

Impressed with the overwhelming interest of the students in becoming involved in the clinic, DeGolia encouraged them to poll staff physicians to see how many would guide students as clinic volunteers themselves. Over 40 indicated interest in participating. William Schwer, M.D., associate professor and associate chairman, Department of Family Practice, accepted the role of physician coordinator.

With the combined efforts of faculty like Dr. Schwer and Eckenfels, and the enthusiasm of the medical students, PCCP began to take shape. Eventually, every Thursday night became "Rush Night."

"What is so special about PCCP is that it combines community service with medical education," says Eckenfels. "St. Basil's provided the ideal setting where this can all happen—where students learn the principles and methods of ambulatory medicine in the process of actually giving health care to a community that is without it.

"Two or three Rush doctors—ideally an internist, family practitioner and pediatrician—attend the clinic on Rush night," says Eckenfels. "They supervise student teams consisting of three students, an M1 and M2, plus an M3 or M4. The students rotate to observe patients assigned to different doctors. They also help teach health education and interact with patients to learn about chronic diseases."

Depending on their year in school, students perform different procedures at the clinic. First- and second-year students take blood pressure readings, medical histories and measure vital signs, while third- and fourth-year students assess the patient's history, perform a physical exam and present a health care plan to the supervising physician. They also act as teaching assistants to M1s and M2s. Attending physicians may intervene in this instruction at any time they feel necessary.

"One of the best experiences of the free clinic," said Greg Bianchi, a second-year medical student, "is the trust patients place in you—it feels great to be accepted by them. You simply have to show that you care—not just about their physical problems—but what's happening to them emotionally. You have to say 'now tell me what's on your mind today. Is there anything that's bothering you?' If they open up and confide in you, you know you've

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gotten somewhere."

"Being able to see patients on a regular basis has sharpened my clinical skills and helped me to relate better to patients," said Greg Thompson, M4. He is now doing his clinical rotations at the Medical Center—as well as participating in the clinic project—and has decided to pursue a career in primary care medicine.

"Because of the clinic, I am more comfortable and confident with patients and doctors, and have a better understanding of those who can't afford expensive hospital care. The experience has helped me with my career choice, and I think students who have made a commitment to the clinic will get the same benefits."

Bianchi feels that, once students are introduced to this type of community service, "we won't just walk away from it when we leave Rush. We will still serve the people who *have* to be served."

The Next Steps...

A grant proposal has been submitted to the U.S. Department of Health and Human Services for funding to hire additional personnel to administer the PCCP and to critically evaluate its efficacy and potential for becoming part of the medical college curriculum.

The project's success has opened doors for related programs. "We are trying to establish contacts at two proposed sites for extensions of the free clinic setting," says Eckenfels.

"We're taking responsibility for our own education," said second-year medical student Chip Roser. He was recently awarded a Health Promotion/Disease Prevention scholarship from the American Medical Students Association (AMSA), under which he will investigate the economic state of clinic patients as part of a health access survey.

To enhance the clinic experience, students began a series of seminars on aspects of care they often encounter with patients. The first lecture concerned making women feel comfortable during a pelvic exam. It was presented by M3 Nancy Glick, whose four years as a volunteer at Chicago Women's Health Center gave her a solid background on the subject.

The College of Nursing

At least twice a year, members of the Student Nurses Association (SNA) visit Rainbow House—a west-side shelter for battered women and children. They host special parties—at Easter and Halloween, for example—with money raised through bake sales, and, last year, donated toys and games to replace those destroyed by a basement flood.

"The children love visitors, especially when we bring toys and candy—they hate to see us leave," nursing student Koby Aylor says, grinning.

SNA also raises funds for the Make A Wish Foundation and Ronald McDonald House. A food drive last Christmas collected goods for a nearby soup kitchen. For experience that will help them later in their careers, they have provided

Occupational therapy students Brenda Renner (left) and Sue Janowski (right) show MS patient Amy Palenica how to use some everyday appliances.

"Our students are not just competing for grades… They're out there (in the community) because they have recognized a need, both in the community and themselves."

Larry J. Goodman, M.D.

free blood pressure screenings for elderly residents at Chicago-area retirement homes.

"I think it's important for students to volunteer outside the Medical Center so they know how to deal with different situations in the future," said Aylor. "I know students who come here and just hit the books; but there's more to it than that. You need more to make your life complete—students who don't realize that will be surprised when they leave school and find that something important is missing."

College of Health Sciences

A project aimed at helping Occupational Therapy students apply the knowledge they had learned in the classroom to a real life situation resulted in assistance to four Chicago agencies.

Ralph Adams, M.S., OTR/L, instructor, occupational therapy, assigned students in his Etiology of Occupation course to visit Chicago area clinics, observe their services and write a proposal for developing an OT program for each agency.

The locations chosen were Chicago House—a north side clinic which helps AIDS patients; Pilsen Catholic Youth Center—a south side center that often acts as a neutral territory where young residents can get away from gangs; Debra's Place—a shelter for battered women, and AIDS Alternative Health projects—a northside guidance center which promotes wellness and alternative treatments to relieve symptoms of AIDS. A portion of the one thousand dollar proceeds of an OT club raffle was divided among these organizations—whether or not the students' OT program suggestions were implemented.

"This project will continue next year," says Adams.

OT students also applied their skills to helping improve the daily activities of an MS patient who has been a guest lecturer at one of their classes for the past two years.

As a joint project, first- and second-year students developed a list of equipment an MS patient would need to make life a bit easier. Karin Opacich, M.H.P.E., OTR/L, assistant professor, occupational therapy, visited the woman's home to assess it for the equipment most needed, and developed a priority list based on the students' more extensive one. With funds raised by both classes, the students presented the patient with a lap board, similar to the mobile table attached to a hospital bed; it attaches to her wheelchair and assists her with eating, writing letters, and other activities which ordinarily require a table. In addition, students supplied a list of possible funding sources for future equipment needs.

OT students also donated clothes, OT books and equipment used in OT treatment, such as splinting material, to victims of Hurricane Hugo.

"Students do not go into occupational therapy because it's a lucrative field," says Opacich. "These students have a very humanitarian mentality."

Dedication: Its History Repeats

"The health professions have had a long tradition of volunteerism," said Jack D. Ohringer, M.D., assistant professor of medicine, digestive diseases, who works with students at the primary care clinic. "Certain time used to be set aside for free care. Then hospitals became more like corporations, the medical field more like a job than a calling.

"Today's Rush University students, whether medical, nursing or health sciences, are working hard to change this. Their community outreach programs show a true commitment to learning from serving the disadvantaged."

"Our students are not just competing for grades," says Larry J. Goodman, M.D., associate dean of Rush Medical College. "They're not just out for personal gain. They're out there (in the community) because they have recognized a need, both in the community and themselves. It's an example the entire Medical Center can be proud of."

John W. Rogers, Jr.

Thomas A. Deutsch, M.D.

Joan E. Weinberg

Three New Trustees Elected by Rush Board

At its June meeting, the Board of Trustees of the Medical Center elected three new Trustees.

Named a General Trustee was John W. Rogers, Jr., president and owner of Ariel Capital Management, Inc. Rogers heads the only minority-owned, full service investment advisory firm in Chicago. A graduate of Princeton University, Rogers has been a member of the Associates, an organization of young professionals with an interest in the advancement of the Medical Center. He is also on the boards of the Chicago Urban League, Chicago Foundation of Education, Juvenile Protection Association and Family Focus.

Elected to serve as Annual Trustees were Thomas A. Deutsch, M.D., and Joan E. Weinberg.

Dr. Deutsch is the new president of the Alumni Association of Rush Medical College. A member of the Rush medical staff since 1984, he is an associate professor of ophthalmology at Rush Medical College and serves as program director of the Medical Center's Department of Ophthalmology.

Joan E. Weinberg (Mrs. Milton) is president-elect of the Medical Center's Woman's Board. A Woman's Board member since 1978, she has served as vice president and as chairman of the Gift Shop Committee and of Promise, the Board-sponsored annual newspaper supplement on health information featuring Medical Center professionals. She earned an arts degree at North Park College and is a graduate of the Presbyterian School of Nursing.

Two Receive Medals at Rush Commencement

Trustee medal recipients (from left) Luther Christman, Ph.D., R.N., and Virginia Winston DeYoung pose with Edgar D. Jannotta, chairman of the Board of Trustees.

Virginia Winston DeYoung, a Life Trustee, and Luther Christman, Ph.D., R.N., the John L. and Helen Kellogg Dean Emeritus of the Rush University College of Nursing, were awarded Trustee medals at the University's Commencement in June. These awards, established by the Board of Trustees in 1987, honor "individuals of distinction who embody the ideals of the Medical Center..."

Mrs. DeYoung was cited as an "indefatigable volunteer for almost five decades." A member of the Woman's Board since 1941, she has served as its president and as chairman of the annual Fashion Show. As a volunteer in Presbyterian-St. Luke's Hospital, she has initiated many programs aimed at enlarging volunteer efforts. The office of the Volunteer Services Department are named in her honor in recognition of a gift from Mrs. DeYoung and her late husband, Herbert C. DeYoung. She has served as a member of the Board of Trustees of the Medical Center since 1969, and is a member of the Board of the Johnston R. Bowman Health Center for the Elderly.

Dr. Christman, the founding dean of the College of Nursing of Rush University, was cited as a "pioneer in elevating the status of nursing as a profession...and as an advocate of the nurse's role as a key member of the health team." His vision supplied the impetus for the development of the Rush Model for Nursing which has been widely studied and emulated in this country and abroad. Throughout his career, Dr. Christman has been a prolific author and speaker, and has been one of the leaders in bringing about a fuller appreciation of nursing among the health professions.

Setting New Standards for Health Care: The Rush Institutes

In the summer of 1990, a 2,000-pound metal beam was hoisted 11 stories and fitted into place in a traditional "topping out" ceremony for the new Clinical Sciences Building on the campus of Rush-Presbyterian-St. Luke's Medical Center. The ceremony included an earlier signing of the beam by representatives of the contractors and unions working on construction and also, significantly, members of the medical staff who will be playing key roles in the development of a series of Institutes which will be mainly housed in the new structure.

The Clinical Sciences Building itself, due for its first move-ins in summer 1991, is roughly twice the size of the Professional Building to which it is linked and with which it is architecturally compatible. Symbolically, however, it represents a major strategic investment in setting new standards of health care for Chicago, the Midwest and the nation through the Rush Institutes.

The concept of the Rush Institutes was first presented publicly in May of this year by Leo M. Henikoff, M.D., president and CEO of Rush, to the Anchor Cross Society, a group of close friends and supporters of the Medical Center. The Institutes, he explained, had their genesis in a series of meetings five years ago by an ad hoc committee of the Board of Trustees formed to look at strategic issues facing the Medical Center.

"These were not talks about capital development but rather about program development," he emphasized. "Underlying all of these discussions was an awareness that Chicago, for all of its great medical resources, did not really stand out on the national scene as *the* place to go for diagnosis and treatment of major medical problems.

"Something of the same thinking was reflected in recent studies of the Chicago health care scene by the Commercial Club," he said.

The Trustee group began to identify medical areas where Rush already was very strong and where there was a large patient base in Chicago and the Midwest that would both be served by and support such programs.

"Five areas stood out very clearly," said Dr. Henikoff, "heart disease, cancer, aging, mental health, and arthritis, bone and joint diseases and injuries. Other areas might develop in the future, but these were to be the starting point for the organization of centers of excellence at Rush that would at the same time identify Chicago itself as a center of medical excellence.

"If other academic health centers were to do the same thing in areas of their special competence, that would be all to the good both for the people of this region and, again, for the City of Chicago," he said.

As the Medical Center's plans moved forward, at first slowly but with a quickening tempo in the past year, "to clearly identify the new resources we were assembling, and to better delineate their role and function, we have decided to establish these centers of excellence at Rush as Institutes," Dr. Henikoff said.

Each of the Institutes was to be organized from the point of view of the patient. Each would be able to assure patients that all the resources necessary for their diagnosis and care would be conveniently assembled in contiguous areas that eliminated the need to go from department to department, from laboratory to laboratory. Each of the Institutes also would have a strong research mission, also built

Architect's rendering of new Clinical Sciences Building.

on a multidisciplinary approach.

This geographical unity of patient care resources (primarily in the Clinical Sciences Building) working in tandem with a dynamic research program is designed to give Rush patients—and the Chicago area—an unprecedented concentration of people and programs to address major health problems facing the Chicago community and the nation as a whole.

The Rush Institutes already are in the process of formation and will be fully functional in the next few years, well before the decade has run its course. Meanwhile, the concept has captured the imagination and support of civic and business leaders who have signed on to ensure the success of the Institutes. While the Institutes themselves and their Leadership Committees are at different stages of development, it is possible to provide a partial listing of those who are dedicating their personal efforts to help the Rush Institutes set new standards for health care.

Joseph Parrillo, M.D., co-director of the Rush Heart Institute, signs the final beam at the topping out ceremonies of the Clinical Sciences Building.

The Rush Heart Institute

Edward A. Brennan, Chairman, President and Chief Executive Officer, Sears, Roebuck and Co., *Chairman*

Hall Adams, Jr., Chairman of Board and Chief Executive Officer, Leo Burnett Company, Inc.

Joan Baratta, Senior Vice President, Harris Trust & Savings Bank

Robert J. Day, Retired Chairman, USG Corporation

Howard M. Dean, Jr., Chairman and Chief Executive Officer, Dean Foods Company

William F. Farley, Chairman and Chief Executive Officer, Farley Industries, Inc.

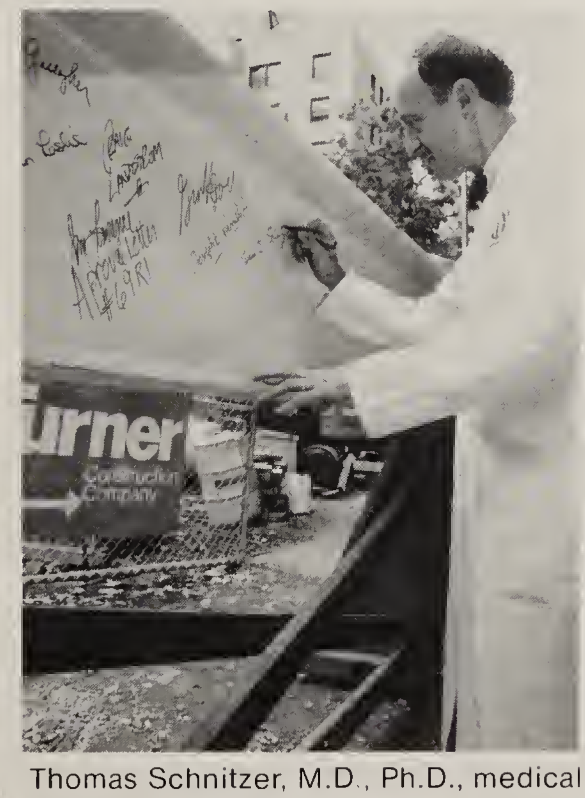
Ronald J. Gidwitz, President and Chief Executive Officer, Helene Curtis Industries, Inc.

Elbert O. Hand, President, Hartmarx Corporation

Arthur Hill, Chairman, President and Chief Executive Officer, Coldwell Banker Real Estate Group

Richard L. Joutras, Chairman of the Executive Committee, Bradley Printing Company; Chairman of the Board, FNW BANCORP

Stephen M. Wolf, Chairman, President and Chief Executive Officer, UAL Corporation and United Airlines



Thomas Schnitzer, M.D., Ph.D., medical director of the Johnston R. Bowman Health Center for the Elderly, adds his name to the beam.

The Rush Arthritis and Orthopedic Institute

S. Jay Stewart, President, Chief Operating Officer and Director, Morton International, Inc., *Chairman*

Charles Barrow, Senior Director, Financial Institutions Group, Blunt, Ellis & Loewi, Inc.

Richard Halpern, Chairman and Chief Executive Officer, Schal Associates, Inc.

Mrs. John P. Keller

Charles Marshall, Retired Vice Chairman, AT&T

Donald E. Nordlund, Former Chairman & CEO, Staley Continental, Inc.

E. Norman Staub, Retired Chairman & CEO, The Northern Trust Company

Carl Stern, Senior Vice President, The Boston Consulting Group, Inc.

Robert A. Wislow, Chairman, U.S. Equities Realty, Inc.

The Rush Cancer Institute

H. Blair White, Partner, Sidley and Austin, *Chairman*

Richard M. Jaffe, Chairman, President and Chief Executive Officer, Oil-Dri Corporation of America, *Vice Chairman*

(Continued)

H. James Douglass, Former Vice President, The First National Bank of Chicago

Mrs. Richard J. Franke

Robert L. Heidrick, President, The Heidrick Partners

Frank W. Luerssen, Chairman and Chief Executive Officer, Inland Steel Industries, Inc.

A. Barry Merkin

Robert P. Reuss, Past Chairman, Centel Corporation

Samuel G. Taylor III, M.D., Emeritus Professor of Medicine, Rush Medical College

Judd A. Weinberg, Chairman of the Board, Judd Enterprises, Inc.

Mrs. James R. Wolfe

The Rush Institute for Mental Well-Being

A Leadership Committee is in formation. The Institute has been adopted as the focus of a major Woman's Board commitment towards the Institute's central component, the Woman's Board Depression Treatment/Research Center.

Proposed: The Rush Institute for Aging

Planning continues to determine the scope of the Institute's activities in aging and neurobiology.

The final beam is lowered into position atop the new Clinical Sciences Building.

Esmond Named Health Plans Head

Truman Esmond, Jr., M.A.S., was named president and CEO of Rush-Presbyterian-St. Luke's Health Plans, Inc., in June. As such, he is responsible for the total operation of the Medical Center's three health plans, RUSH-Anchor, an HMO; RUSH-Access, an independent practice association; and RUSH Contract Care, a preferred provider organization. These health plans have a total membership of some 290,000 individuals in the metropolitan Chicago area.

His new position represents a return to the Medical Center for Esmond, who served as vice president of finance at Rush from 1976 to 1981. He most recently held the post of executive vice president/chief financial officer of Michael Reese Hospital and Medical Center, Chicago. Esmond, who received his master's degree in accounting sciences from the University of Illinois at Champaign-Urbana, has also served as a partner at KPMG Peat Marwick. His articles have appeared in numerous trade publications and he is the author of a book on hospital resource management and budgeting.

Rush-Presbyterian-St. Luke's Health Plans, Inc., is a not-for-profit corporation offering employers a choice of employee health plans from a single source. RUSH-Anchor, one of the largest HMOs in Illinois, has 16 offices in Chicago and suburbs, serving some 1,800 public and private employers. RUSH-Access includes some 2,400 primary care physicians and other specialists and 34 hospitals in the Chicago metropolitan area and northwest Indiana. RUSH-Contract Care's preferred provider and utilization review programs cover more than 120,000 employees and dependents and its system includes 31 hospitals and some 1,800 physicians.

Synthetic Fluid Aids Coronary Angioplasty

Fluosol, a milky-white, synthetic, oxygen-carrying fluid useful in relieving ischemic symptoms during the non-surgical coronary angioplasty procedure, has been introduced at Rush by Gary L. Schaer, M.D., appointed director of the cardiac catheterization laboratory last spring. Dr. Schaer has been interested in Fluosol since his involvement in its research and testing at Georgetown University.

At Rush, Dr. Schaer has performed two successful angioplasty procedures on patients—the first in Chicago to use Fluosol after FDA approval. Without Fluosol, these patients may have experienced a more painful procedure.

"During angioplasty, the catheter is positioned and its balloon inflated to expand the blocked coronary artery. When the balloon is deflated and the catheter removed, it leaves a wider passage for the blood to flow to the heart," said Dr. Schaer.

But while the balloon is inflated, blood and oxygen can't get from the artery to the area of the heart it supplies. Because of that lack of oxygen, the heart cannot contract properly and patients experience chest pain.

"In most situations, since we only keep the balloon inflated for a few minutes, most patients can tolerate the discomfort," said Dr. Schaer. "But sometimes we need to keep the balloon inflated for longer periods of time—four minutes or more. Keeping the blood flow obstructed for that amount of time may cause trouble with the heart function, severe chest pain and, occasionally, low blood pressure."

If these complications are expected, Fluosol is prepared in advance by lab technicians and pumped through the hollow catheter while the angioplasty balloon is inflated.

How can one predict a heart

Gary L. Schaer, M.D., prepares for an angioplasty procedure.

muscle problem in an angioplasty patient?

"It depends on how much of the heart muscle is at risk during the procedure," said Dr. Schaer. "We can usually tell if a patient is a good candidate for Fluosol based on the results of a previous heart catheterization and his or her medical history. For instance, patients with multi-vessel disease—where more than one artery is narrowed—may benefit from Fluosol during their angioplasty procedure.

"Fluosol supplies oxygen to the heart muscle through the angioplasty catheter," said Dr. Schaer. "When the artery is blocked with the balloon, blood cannot deliver oxygen to the heart muscle. Fluosol carries tiny, oxygen-rich particles to the heart and acts as 'artificial blood'."

At Georgetown, he and colleagues found that when they pumped Fluosol through the angioplasty catheter beyond the blocked artery, patients tended to have less severe chest pains, and the heart muscle function was better because the heart was getting enough oxygen.

Since Fluosol must be prepared in advance, if unexpected complications arise during a procedure, other methods must be used to return that patient to a stable condition. Fluosol cannot be used in an emergency situation—it cannot be simply "grabbed off the shelf," although researchers are now testing ways to prepare Fluosol more rapidly.

Fluosol has been tested for other applications, such as improving heart muscle function in patients with heart attack, and for treating patients with cancerous tumors.

"What researchers have found is that Fluosol brings oxygen to the tumor and makes it divide and grow," Dr. Schaer says. "Although that sounds bad, actually the oxygen makes the tumor more susceptible to radiation, because as it grows, it becomes an easier target."

Fluosol has no side effects—other than a possible headache or a rare allergic reaction. What else could patients ask for?

They might ask how the body gets rid of Fluosol. Well, like all oxygen that gets into the blood, it reaches the lungs and is eventually exhaled. J.R.

Volunteers Cuddle; Babies Thrive

Three employees of Rush-Presbyterian-St.Luke's Medical Center, having just completed a detailed training session, follow Judy Friedrichs, M.S., R.N., assistant unit leader, special care nursery. They go through double doors into the humming but hushed environment of the intensive care nursery in the new perinatal center.

As Friedrichs shows them how to scrub and put on sterile gowns, their giggles increase a bit. Nervousness and awe are gradually replaced by softly-voiced questions and motherly crooning, as each is introduced to a premature or ill baby to hold and cuddle.

The nurses on the unit are friendly, watchful and helpful. Each baby is monitored as to heart rate and use of oxygen; each volunteer must find a way to be comfortable with the attached wires, and the sometimes frightening beeps that come from the babies' machines.

This is the Medical Center's "Cuddler Program" in action. An activity of the Rush Volunteer Services Department and Maternal-Child Nursing, the program is for basbies in the special care nurseries identified as "high need" by a physician-nurse team. According to Diane Steinbrink, assistant director of volunteer services, the program resulted from public interest, sparked by TV documentaries about babies suffering from withdrawal symptoms because of their mothers' addictions, or babies born with AIDs.

"Consequently," Steinbrink says, "Judy Friedrichs and I wrote a proposal and were delighted when it was approved." The program is structured to protect the confidentiality of each tiny patient's circumstances and special procedures are in place to guard against the possible spread of disease.

Twenty-two volunteers have signed up since the program began. Although the majority are women, two men have joined the group. After a three-hour orientation and coaching session, they commit to a schedule that the nurses can depend upon. Some volunteers come one lunch hour a week, others come for several hours at a time.

One dedicated nursery volunteer is Helen Murphy. She travels to the Medical Center from her far south suburban home because, as she says, "There's something about babies. They look at you and you know they want to be held. I always hurry to the unit as fast as I can, because I know someone is waiting for me."

"Babies need the feeling of

warmth, the sound of a soft voice, in order to grow and develop," Friedrichs says. After being held or stroked for a few minutes, she points out, a baby's heartbeat has usually moved to a resting rate and the monitor shows a more regulated breathing pattern. In addition to helping the babies, the program also aids the busy nurses. "When we know a volunteer is scheduled to come," says Friedrichs, "we can better plan our activities. Also, if there are cuddlers here during the change of shifts the babies are much more calm."

Friedrichs leads her new volunteers on a tour of the special care nursery, introducing staff and providing tips on comforting the babies they may "cuddle." Everyone watches as volunteer Roylene Gallas learns how to reach into an isolette with gloved hands to caress a tiny "preemie."

"Just cupping your hand on the baby's back and putting your other hand near her head can create a feeling of closeness and loving contact," Friedrichs tells the group. "And the baby can hear you through the plexiglas isolette, so you can talk to her."

But Gallas is already engrossed, bending close, telling the baby she's such a pretty little girl..."such a go-o-o-ood baby..." The cuddling process has begun. S.D.

In the special care nursery, Volunteer Helen Murphy prepares to "cuddle" a new baby, while Karen Murray, R.N., looks on.

Computers Contribute To Wrist Problems

Anyone who spends time daily tapping the keys on typewriters or word processors should be aware that numbness, tingling, lack of sensitivity, and pain in the fingers could signal more than tiredness from too much time at the keyboard. It could mean carpal tunnel syndrome.

Carpal tunnel syndrome is an abnormality of function of the median nerve, due to pressure on the nerve as it passes through the wrist or carpal canal, according to Robert R. Schenck, M.D., associate professor and director of the Section of Hand Surgery, Departments of Plastic and Orthopedic Surgery at the Medical Center.

"Motion of the fingers causes the nine tendons surrounding the median nerve to slide back and forth within the carpal canal located at the junction of the wrist and palm," says Dr. Schenck, who has been at the Medical Center since 1972.

"Prolonged repetitive motion of the fingers can cause the tissue on the surface of the tendons to become thickened and inflamed, putting pressure on the median nerve within the unyielding carpal canal. Excessive flexion or extension of the wrist can also put pressure on the nerve," Dr. Schenck adds.

Carpal tunnel isn't just a local problem. Dr. Schenck recently conducted a nationwide survey of over 400 hand surgeons. Annually, each surgeon examined an average of 117 carpal tunnel syndrome patients. In Dr. Schenck's case, he sees an average of 500 cases a year, and about 15 percent of this total is linked to computer-related occupations.

One of these patients is Angelina Acosta who has spent the past three years with a bank in Chicago working as a deposit teller which involves keying-in data and typing.

Suddenly, her routine work became routine anguish.

"First, I had a harsh pain in the palm of my left hand," she recalls. "I couldn't move my two middle fingers."

Acosta thought she had a pulled muscle but it was later diagnosed as carpal tunnel syndrome. The pain which began in her left hand soon struck her right hand.

"I couldn't take a coffee cup from the kitchen to the living room because of the excruciating pain," she says. The pain which started in her hand gradually moved up to her wrist, elbow, and neck.

Generally, computer-related carpal tunnel syndrome is less severe than industry-related cases, so doctors can often use conservative (non-operative) treatment methods which include wrist splinting to minimize bending or extension and oral or injected steroids which help to decrease swelling and irritation. Surgery which divides the wrist ligaments and thus releases pressure on the nerve is a last-resort option.

In Acosta's case, splinting did not help the pain. "One day, I was keying-in work with the splints on but then I couldn't move my fingers." She had surgery performed on her right hand. Surgery greatly reduced the pain but did not eliminate it completely.

"The problem with surgery," says Dr. Schenck, "is that not everyone gets well."

Dr. Schenck believes there is a rise in incidence of carpal tunnel syndrome. A strong contributor is today's push toward increased productivity. Employees hired to meet certain quotas (e.g.,words/minute) are often paid bonuses for exceeding these goals. Continuous work with little change in task concentrates the pain.

Awareness is another key to the rise. "It's not unusual for a patient to inform their doctor of their diagnosis," Dr.Schenck explains.

If surgery is performed, carpal tunnel syndrome costs Illinois industry approximately $25,000 per victim (which includes medical costs, time off, and workers' compensation). "Through awareness and prevention programs, the number of carpal tunnel syndrome cases can be reduced by 20 percent," he says.

Prevention steps include finger exercises, regular breaks, and maintaining proper posture. Keyboards should be positioned in relation to chairs and desks so wrists and hands remain comfortable with the wrists straight. Workers with carpal tunnel syndrome might also consider job reassignments. "For those who do not consider this option, they're very likely to get the same symptoms over again if they go back to the same job," Dr. Schenck notes. S.O.

Roger C. Bone, M.D., presents the Distinguished Alumna award to his former teacher, Vida Gordon, M.D., at the Rush Medical College alumni homecoming.

Vida Gordon, M.D. '34: Distinguished Alumna

"Rush Medical College has meant everything to me. Having this institution listed on my c.v. has opened many doors for me personally and professionally. Rush professors made medicine so fascinating that it became my avocation as well as my vocation," said Vida H. Gordon, M.D., a 1934 graduate of Rush Medical College (RMC), in accepting the Distinguished Alumna Award during the Alumni Association's annual Homecoming in June.

The 83-year-old Dr. Gordon, the 23rd recipient of the award, was visibly touched that one of her former students, Roger C. Bone, M.D., the Ralph C. Brown, M.D. professor and chairman of medicine, Rush-Presbyterian-St. Luke's Medical Center, made the presentation.

In introducing Dr. Gordon, Dr. Bone lauded her many personal and professional achievements. "When she took the national Board Examinations in 1931, she scored *second* in the United States among those taking the examination," he said.

Born in Rowley, Massachusetts in 1906, Dr. Gordon was one of 13 women in the 1934 graduating class of 159. She served an internship at the Los Angeles County Hospital and completed her residency in pediatrics at the University of Michigan Hospital, Ann Arbor. She holds a master's degree in public health from Johns Hopkins University.

Dr. Gordon almost single-handedly founded the Department of Pediatrics at the University of Arkansas for Medical Sciences (UAMS), Little Rock. In 1943, when she was named director of the Arkansas Crippled Children's Program and a UAMS assistant clinical professor, the university had no department of pediatrics. When she learned that health care funds for children were available through the Arkansas State Health Department, she proposed the development of a separate department of pediatrics at the school of medicine. The department was established in 1947.

In 1954, she helped organize the Arkansas chapter of the American Academy of Pediatrics and served as its president for five years. As the first board-certified pediatric allergist in Arkansas, she established a two-year fellowship program at UAMS in allergy and immunology.

Currently professor emeritus in pediatrics and immunology, Dr. Gordon *still* consults in the general pediatric clinic at the Arkansas Children's Care Center.

Among the many tributes paid to her are the establishment, in 1983, of the Vida H. Gordon lectures in allergy and immunology by the Alan Cazort Allergy Society of Arkansas, the 1983 award of merit from the American College of Allergists, and an honorary doctor of science degree from UAMS.

"Rush professors taught me a superior approach to differential diagnosis, compassion for the patient and, particularly, the importance of following through on all phases of treatment to accomplish improvement in the patient," Dr. Gordon said. "Nothing has stimulated me more than to solve a problem case and see the patient get better—and it still does at the age of 83!" B.H.

Rush Tests New Ways To Remove Gallstones

Your transgression? A plate of fettuccine Alfredo, a piece of cream pie, or perhaps just a few French fries. Your penance? Hours of gut-wrenching abdominal pain and indigestion. If this scenario sounds familiar, you may be one of approximately 20 million Americans who suffer from gallstones.

Gallstones "are, quite literally, stones that form in the gallbladder," says Donald M. Jensen, M.D., associate professor and chief of clinical hepatology, Section of Digestive Diseases. It's estimated that ten percent of the population develop gallstones at some point, but only five percent experience symptoms. "The stones that ultimately cause pain and discomfort are those that become lodged in the ducts that drain bile from the liver," Dr. Jensen says.

Symptoms—upper abdominal pain, nausea and indigestion—often occur following a meal high in fat. Yet, dietary fat has little to do with the formation of stones.

What *does* cause gallstones? Obesity tends to increase the risk. Others may inherit a predisposition to gallbladder problems. "Cholesterol, which is secreted by the liver, is normally dissolved in the bile by bile acids and phospholipids. Some people, however, by virtue of their genetic make-up, secrete too much cholesterol and produce too little bile acid. When the bile becomes too enriched in cholesterol, the fat precipitates into crystals, which cluster together to form stones," says Dr. Jensen.

Gallstones come in two varieties: cholesterol and pigment. Less-soluble pigment stones account for about 20 percent of gallstones. "The only way to treat pigment stones is to remove the gallbladder," says Dr. Jensen.

Until recently, the standard treatment for *any* gallstone was surgical removal of the gallbladder. Today, however, innovative procedures are offering effective, non-invasive treatment to many patients who suffer from cholesterol stones. Rush is among the leading medical centers testing and applying these new technologies.

One of these treatments, Actigall (ursodiol), is an oral medication that replaces a patients' naturally occurring bile acids, allowing cholesterol stones to slowly dissolve. Approved by the FDA last year, Actigall is "virtually free of side effects," says Seymour M. Sabesin, M.D., the Josephine Dyrenforth Professor of Gastroenterology and director, Section of Digestive Diseases. "It's an effective, convenient way to treat patients who have small cholesterol stones."

Another non-surgical treatment, lithotripsy, uses sound waves to fragment gallstones. Repeated shock waves, precisely focused on stones within the gallbladder, break the stones apart. Actigall is then administered to dissolve the small fragments that are left in the gallbladder. A lithotripsy machine—one of only three in the Chicago area for the treatment of gallstones—is housed at Rush North Shore Medical Center in Skokie.

According to Dr. Jensen, patients typically require 1-3 outpatient treatments, each of which lasts two hours. "There's no need for sedation or anesthesia," he says. "In fact, many patients return to work when the procedure is done."

Lithotripsy is investigational, but preliminary results are promising. "Rush's success rate with lithotripsy is one of the highest in the country," says Dr. Jensen, who heads the Rush lithotripsy study.

When cholesterol stones are exceptionally large or the gallbladder inflamed, surgery is the best option. With over 500,000 surgeries performed yearly, cholecystectomy, i.e., removal of the gallbladder itself, is one of the country's most common major surgical procedures, second only to cesarean section.

In an attempt to minimize discomfort and hasten patients' recovery time, Rush is investigating *laparoscopic cholecystectomy*. Using a laparoscope, an instrument consisting of a tube and an optical system for viewing the inside of the abdomen, a surgeon is able to remove the gallbladder through a small incision, usually through or around the navel. "Muscles and nerves aren't cut, so less time is required to heal," says Dr. Jensen. "After conventional surgery, patients leave the hospital in 4-5 days and return to work in 4-6 weeks. Following laparoscopy, most people are released the next day and return to work in three days."

For specialized cases of gallstone removal, a similar procedure, endoscopy, can be effective. Using an endoscope, a physician is able to remove stones that may be impacted in the bile duct.

With this success, treatments that do not require a lengthy hospital stay are bound to enjoy continued popularity. "I think the whole field is moving towards less invasive ways of treating gallstones," concludes Dr. Jensen. C.J.

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